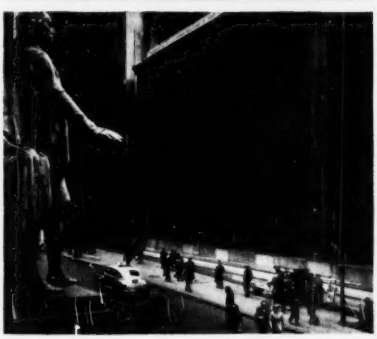
Chemical Industries Week

January 27, 1951



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Dimethyl Phthalate

•

Diethyl Phthalate

•

Dibutyl Phthalate

•

Di-(2 Ethyl Butyl) Phthalate

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Dioctyl Phthalate (DOP)

•

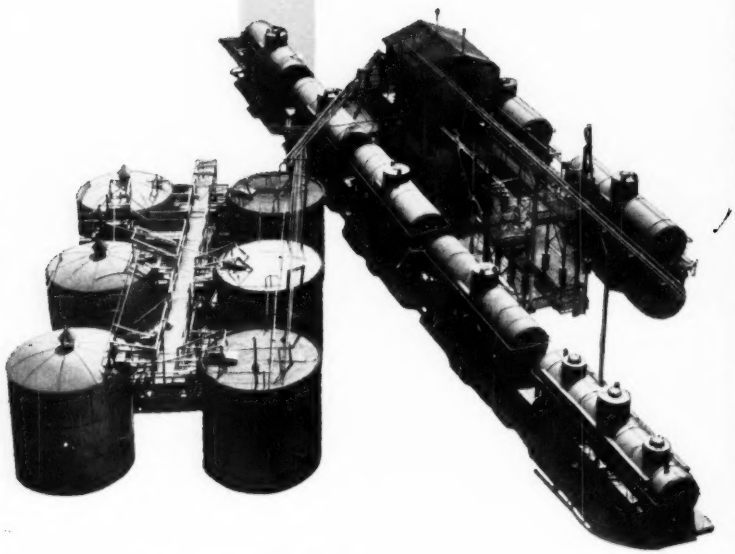
Di-(Methoxy Ethyl) Phthalate

•

Triacetin

•

Tributyrin



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- *FOR STABILITY*
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INDUSTRIAL

CHEMICALS

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Volume 68 Number 2

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OPINION . . . . . .

The Vital Resource

It is now patently clear that the outcome of any full-scale war, and the very survival of our country, will hinge not on manpower but rather on brainpower. The hundreds of millions of men available to Russia and her satellites stand in sharp contrast to the limited manpower available to the U. S. In a quantitative sense we are overshadowed; qualitatively we are superior and we must strive to maintain that superiority. Succinctly, technological know-how is the all-important resource we must exploit.

Nonetheless, confusion and chaos seem to reign in Washington. There are as many opinions as to what should be done about utilizing the skills of technical men as there are advisory committees. And there is, correspondingly, a seemingly woeful lack of appreciation of the absolute necessity of maintaining a flow of chemists, physicists and engineers from our universities.

Little doubt should exist in our minds as to what General Hershey, who still dominates policy under the Selective Service Law, thinks about the deferment of technical men. He voices his thoughts on the subject neatly . . . "a lot of baloney." Let's examine that "baloney," look at the facts; appraise them logically, unemotionally.

First of all there can be no gainsaying that the chemical process industries—the single largest segment of U. S. industry—are essential. Nor can it be questioned that these industries can function efficiently, can produce the multitude of products vital to our military and essential civilian effort, only if they are adequately staffed with competent technologists. Could an eyebrow be raised at the statement that technical know-how is the basis for our nation's *entire* productive capacity—the capacity that awes Russia? We think not.

What impact would the wholesale drafting of technical men have on our industry? Here is one indication: Recently the Manufacturing Chemists' Association completed a survey of a segment of its membership. It embraced 27 representative companies employing 19,500 technical men. Of that total 21.6 per cent were members of either the active or inactive reserve.

The drafting of even half these men would create a serious situation, quite possibly cripple our defense effort. And more, not fewer men will be needed soon. New plants are being built, and plenty of them. Who's going to staff them?

Entirely apart from the problem of deferment policy is the question of building up our stockpile of technical men. An axiom of any contest, be it business competition or war, is to know what your adversary is doing. What has Russia done? Was it pure happenstance that Russia transported thousands of German scientists to unknown locations deep in Russian territory? Or that Russia has developed a highly competitive technological educational program in which, by order, a large proportion of that country's manpower between the ages of 18 and 26 is engaged?

In contrast, we are not building up our reserves of technical manpower. Take engineers as an example: At its peak in 1948, enrollment of engineering students was 236,000; last fall it had slumped to 130,000; by next year it may well dip to 90,000.

There is a distinct possibility that Russia's scientific manpower will exceed ours—in numbers—by 1952.

It is not our contention that all technical men should be deferred. There is no more logic to such a suggestion than to plead that all lawyers, all doctors, all members of any profession be exempt. However, we do feel that a complete analysis of our manpower situation, of the needs of both the military and essential industry, should be made.

Too, Washington might well adopt a uniform policy of "call ups"—uniform among the Army, Navy, and Air Force. Likewise, the mistakes we made only a few years ago should be considered. Essentialities and grounds for deferment should be clearly defined with little leeway left to local draft boards.

There is, to our mind, little reason to object to UMT. But let's not pull all young men out of technical schools and colleges. Industry cannot afford the two-year hiatus that would create. Rather, let's see if it is not possible to place young men with demonstrated aptitudes in technical schools, in uniform if necessary, under the aegis of the military.

A complete and early analysis of our manpower needs must be made. Then we can chart an intelligent course.

W. Alec Jordan, *Editor*

OPINION . . . . . .

High M. P. Waxes

To the Editor: Your interesting article on waxes which appeared on page 563 of the October 1950 edition should contain additional information.

Wax production on the West Coast commenced on a large scale in 1941, on the basis of the production of Aristowax by Union Oil Company of California. Almost immediately Standard Oil Company of California started to market Standard Refined 125/130, 143/150 and 160/165 AMP wax. This source of fully refined high melting waxes was of critical importance during World War II.

Standard Oil of California recently completed very large wax refining facilities and is now offering additional tonnage of wax covering the above brands.

H. E. Bramston-Cook
Oronite Chemical Company
New York, New York

Author Mersel and CIW's editors bow in deference to Reader Bramston-Cook who knows whereof he speaks. It was he who instigated the production of high m.p. waxes on the Pacific Coast.—Ed.

Epon Resins

To the Editor: With reference to your article "Glycerine Dividend" appearing in your November issue, we should like to call your attention to the omission of a key company, Grand Rapids Varnish Corporation, in the list of companies reported to have developed satisfactory commercial surface coating formulations from the Epon resins. . . . .

Grand Rapids Varnish Corporation should be mentioned, particularly since they pioneered development work on the use of Epon resins in industrial primer applications, especially with reference to work done with the Whirlpool Corporation mentioned in your article, on the use of Epon resins as primers on washing machines, ironers, and driers of the Whirlpool and Kenmore line.

We very much appreciate your excellent coverage of this new development and the space accorded to it but felt that in all fairness, you would wish to call attention to the part played by Grand Rapids Varnish Corporation.

V. C. Irvine
Manager, Sales Development
Shell Chemical Corporation
New York, New York

CI mentioned a half dozen users of Epon resins, didn't attempt to list all consumers.—Ed.

New

STAINLESS STEEL CHEMICAL CONTAINERS

by

Hackney
MILWAUKEE

Ideal for shipping and storing nitric acid, phosphoric acid, solvents extracts, fruit juices, oils and many other products

LOWER COSTS
Shippers of chemical products can now enjoy important savings—thanks to a new Hackney Stainless Steel Chemical Container. Compact and lightweight, this 15-gallon barrel can be handled easily by one man, reducing handling costs. What's more, further savings are possible because of the lower transportation costs, reduction in storage space and elimination of breakage.

EASILY CARRIED
Rugged, full curled separate foot ring construction provides easy, quick and sure handling. Empty or full, Hackney Acid Barrel can be readily grasped and handled by handy ring.

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Ownership of Hackney barrel clearly indicated by easily read letters in bottom foot ring. Prominent display of owner's name and address also serves as a permanent advertising medium. ICC data embossed in top ring.

POUR SAFELY
No hazards of slipping, dropping or spilling strong, dangerous acids! That's because of the safe, positive grip assured by the curled foot rings.

STACK PERFECTLY
Hackney Acid Barrels are designed for positive stacking. Bottom foot ring fits snugly and securely over top ring of next barrel. Barrels cannot fall from this compact stack. Hackney Acid Barrels are offered in various types of stainless steel—with specific type dependent on intended use. Write today for full details.

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CONTAINERS FOR GASES, LIQUIDS AND SOLIDS

Mutual's

CHROMIC ACID

OTHER NAMES: Chromic Anhydride, Chromium Trioxide

FORMULA: CrO_3

MOLECULAR WEIGHT: 100.01

DESCRIPTION: Deliquescent, dark red flakes. Bulk density averages 105 lb. per cu. ft.

CrO_3	99.75% min.
Chloride as Cl	0.01% max.
Sulfate as SO_4	0.1 % max.
Insoluble in water	0.01% max.

USES: Chromium plating. Anodizing of aluminum. Metal surface treatment, including cleaning, pickling, etching, coloring and improvement of corrosion resistance and paint adherence. Pigment manufacturing. Organic oxidation syntheses, as in the production of dyestuffs and pharmaceuticals. Manufacturing other chromium chemicals and catalysts.

SHIPPING CONTAINERS: Steel Drums — 100 lb. net

OTHER MUTUAL PRODUCTS

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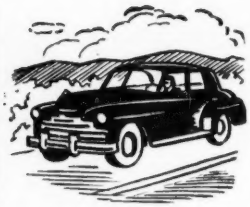
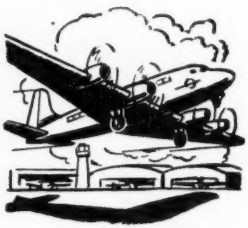
POTASSIUM BICHROMATE — POTASSIUM CHROMATE
AMMONIUM BICHROMATE



CHROMIUM PLATING



METAL SURFACE TREATMENT

PIGMENTS

PHARMACEUTICALS

MUTUAL CHEMICAL COMPANY OF AMERICA

270 MADISON AVENUE ● NEW YORK 16, N. Y.

MUTUAL CHEMICAL CO OF AMERICA — SINCE 1845

Chemical Industries Week

BUSINESS MAGAZINE OF THE CHEMICAL PROCESS INDUSTRIES

NEWSLETTER

Power is currently the limiting factor in chlorine output. Except for three units—Southern Advance Bag & Paper Co. (Hodge, La.), Rocky Mountain Arsenal (Denver) and Frontier Chemical Co. (Wichita)—all U. S. chlorine plants are operating up to the limit of available power. Boosting output beyond nominal capacity, by upping current density, is stymied in many plants for the same reason.

Defense contracts are a current source of friction between the Munitions Board and the General Accounting Office. The Board wants the same general rules in regard to contract termination and renegotiation as were followed in World War II—i.e., the Government agency could agree with the contractor as to terms, etc., and that would be the end of it. GAO wants to "hold on" longer by reviewing terms, leaving door open to reopen termination proceedings at future date.

American Cyanamid Co.'s new acrylonitrile fiber is a likely product guess for the company's proposed plant near Savannah, Ga. Option on a site has been obtained, and unconfirmed reports in Georgia newspapers indicate that $100 million may ultimately be invested there. Initial employment of 600 persons is envisioned.

The new fiber is known to be close to commercialization, a sales development program is reportedly under way, the South is favored for textiles. It adds up.

An even larger expansion of aluminum production than was expected a few weeks ago is now planned by Aluminum Co. of America for its Point Comfort Works (Port Lavaca, Texas). Two pot lines will be added to the original three, raising capacity from 114 to 190 million pounds a year. Estimated cost is $15 million. Construction will start as soon as contracts can be arranged and material and equipment obtained.

An additional 80 million pounds of magnesium will be added to annual U. S. production after May 15, when the government plant at Freeport, Texas, is taken out of mothballs. Partially shut down in 1945, it ceased operation.

Dow Chemical Co., has let contracts for a $70 million expansion, also at Freeport. One of them, for $10 million, went to Stone & Webster. Among facilities to be built: four power plants, a 20-inch pipeline (by United Gas) to bring in natural gas (150 million cu. ft./day) from Needville, 55 miles north of Freeport.

Solvay Process Division plans new alkali capacity at two locations: at Syracuse, N. Y., a $2.5 million plant to double ammonium bicarbonate capacity; at Baton Rouge, a 600-tons-a-day soda ash plant, certificate of necessity for which has been requested. Soda ash will be pinched as glass replaces defense-slated metal.

Mathieson Chemical Corp.'s 1950 annual report is among the first to be released. If it is representative, then 1950 was a record-breaking profit year. Sales were up to $76 million from $54 million the year before; profit after taxes was $9 million against $7 million in 1949 (and 1950 taxes were almost twice as great).

Impact of Korea shows up in final-quarter figures: Earnings before taxes were $5.5 million in the last three months of 1950; $2.5 million for the 1949 period.

Higher chemical pulp prices? U. S. purchasers from Sweden are anxiously assessing the effect of Sweden's new export levy, which became effective the first of the year. Swedish businessmen, already plagued by rising costs, may be forced to pass it on to customers. Dilemma: Price is already too high for many customers.

Fearing curtailment of drug exports by the U. S. and Britain, the Australian government will soon regulate—drastically—use of several antibiotics (including streptomycin, aureomycin, chloromycetin). Also being sought by Australian pharmaceutical manufacturers: licenses to produce ACTH.

Gold Seal Co. (Bismarck, N. D.), originator of Glass Wax, is extending promotion of its new product, "Snowy", to several new markets. First test-marketed in Chicago, it is now being pushed in Milwaukee; Los Angeles, San Diego, San Jose, San Bernardino, Bakersfield and Riverside (Cal.); Fargo and Bismarck (N. D.). It is also being sold elsewhere, but advertising has been confined to those cities.

Chief selling plug for the powdered laundry bleach is its safe use on nylon, rayon, silk and wool. Suggested price for 20-ounce carton is 49¢.

S. C. Johnson's new no-rub furniture polish, Pride, will be on store shelves by mid-February. A blend of waxes, solvents and cleansing agents; it is similar in principle to Car-Plate. Furniture does not have to be washed, candy and other soluble stains come off. Finish is hard and lustrous, doesn't collect dust, lasts several months. It also works on enamel and porcelain.

Spred Satin, Glidden Co.'s water-emulsion paint, is given credit by the company for the all-time-high sales and profit showing of its Paint and Varnish Division in 1950. Total company sales in the fiscal year (ending in October) were up $28 million to $188 million, profits up $2.4 million to $8.6 million.

Here and There:

Harvey Machine Co.'s primary aluminum plant at Kalispell, Mont., is now under construction. Financed by Federal assistance, the plant will turn out 72,000 tons a year. Only about a quarter of the output, however, will find its way to the open market . . . . Also in the West: Crown Zellerbach Corp. is spending $1 million to modernize its West Linn, Ore., plant; Cascades Plywood Corp. has invested the same amount in a new waste wood-utilizing hardboard plant at Lebanon, Ore.; Wesco Waterpaints, Inc. (Vernon, Cal.), is expanding water-soluble paints and pigments capacity.

Record-length court fight by Department of Justice to break up Aluminum Co. of America ended this month with Alcoa still intact. Only concession won by Government: Alcoa stockholders who also own stock in Aluminum, Ltd. of Canada must dispose of holdings in one or the other. Ten years are allowed for the disposal.

Paper and pulp expansions: Halifax Paper Co. will invest $5.8 million in expanded facilities at Roanoke Rapids, N. C.; St. Helens Pulp & Paper Co. (St. Helens, Ore.) plans a $3.6 million modernization and expansion program over the next few years; Coronado Manufacturing Co. will build a $4 million wrapping paper plant on a site adjacent to Oklahoma Ordnance Works, capacity will be 150 tons a day; Columbia Cellulose Co. Ltd. (Celanese subsidiary) is fast completing its 70,000-tons-per-year dissolving pulp plant in British Columbia. Production starts next month.

. . . The Editors

Briefs

From recent literature

Dichlorobutadiene resins can be stabilized against discoloration and other deterioration by using as little as 0.5% by weight of a 4-alkylphenyl salicylate prepared from nonylphenol.

Polyethylene's surface characteristics can be improved by water soluble alkyl aryl polyglycol ethers. These are made from alkyl phenol and ethylene oxide and applied as an aqueous solution containing from 0.25% to 10% by weight of the ether. Deposition should amount to two to fifty milligrams of alkyl aryl polyglycol ether per square yard of film surface. Deposition temperatures should be maintained within the range 0° to 45°C.

Long chain compounds of the alkyl heterocyclic type can be made by condensing 2-nitro- or 2-amino-4-alkyl phenols with suitable substances to affect ring closure. Resulting products show properties not demonstrated by their unsubstituted or short-chain homologues.

An addition agent for mineral oil lubricants is produced by causing a long chain phenol to react with sulfur monochloride and phosphorus sesquisulfide. This additive confers excellent pressure-carrying, corrosion-inhibiting and detergent properties on the oils. Corrosion-inhibiting properties may be increased by adding a condensation product of the aluminum salt of the alkyl phenol derivative and formaldehyde or a formaldehyde-yielding product.

These developments are abstracted from recent publications of U. S. patents. The uses may suggest other applications of Jefferson Alkyl Phenol C-9 in your products or processes.

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ELEVATED TEMPERATURE PROPERTIES

of Type 321
Titanium Stabilized Austenitic
Chromium Nickel Steel

	TEMP. °F	STRESS-PSI
Creep: 1%—10,000 hrs.	1100	16,000
	1200	11,000
	1300	7,000
Stress for Rupture in 1000 hrs.	1100	32,000
	1200	21,000
	1300	12,000

A.I.S.I. type 321

Titanium stabilized stainless steel offers many competitive advantages at a substantial saving in cost compared to other types of stabilized stainless. The excellent high temperature properties, shown here, are an example. Alloys of Titanium used in making type 321, are made at Niagara Falls from U.S. ores. This assures the user a plentiful supply of type 321 stainless steel.

TAM does not make or supply steel of any kind. But, as developers of titanium alloys such as 25% and 40% Low Carbon Ferro Titanium required in making 321, we can furnish much worthwhile data. Write our New York office.

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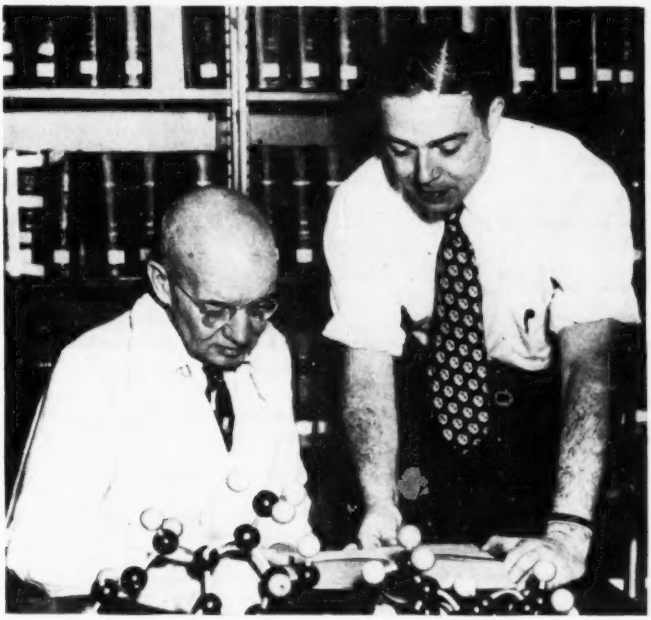
WHAT'S NEW . . . . . .



LA FORGE AND SCHECHTER: Molecules for G. I. bug bombs.

Prop for Allethrin

Allethrin has been specified as an active ingredient in new Army low-pressure aerosol formulation. Bids for 2 million such units are being let; more are expected to follow.

Reasons: (1) Pyrethrum, an imported stockpile insecticide, is very short; and (2) the military wants to encourage production of the synthetic substitute, allethrin.

Reaction: (1) Formulators and aerosol packers are scrambling for limited amounts of available allethrin; and (2) increased output of allethrin is planned.

The new specifications come hard on the heels of the U.S. Department of Agriculture's approving allethrin in aerosols (*CI Newsletter, Nov. 1950*). They certainly are causing no tears in that Department's ranks, for the synthesis of the pyrethrum-like insecticide allethrin by USDA chemists F. B. La Forge, M. S. Schechter and N. Green was one of 1949's brightest achievements.

An insecticide with quick knockdown is needed against flying insects, and pyrethrum, principal production of which is under the control of the Kenya (So. Africa) Farmers' Association, has been prized for this quality. Now with G.I.'s fighting bugs as well as men in remote areas, the USDA discovery can supply an adequate replacement and free us from dependence on imported material.

Since each 12-oz aerosol can will contain 0.6% allethrin—other ingredients: DDT, 2%; alkylated naphtha, 5%; deodorized kerosene, 7.2%; and inert propellent mixture of Freon 11 and Freon 12, 85%—the amount of active allethrin needed for the initial order will be about 9,000 lb.* Opinion varies as to just how much of that is on the market, or has ever been made.

Although the switch in specifications for the large order (actual number is 2,049,000 aerosols) was a hurried one, the government must feel that the bid can be filled by allethrin already produced and in the process of being produced. Delivery will be at the rate of 25% every 30 days, and that should make the supply problem easier.

Company for Carbide: The first company to achieve commercial production of allethrin was Carbide and Carbon Chemicals (*CI, April 1950, p. 506*). The company did not build a plant for the product, but scheduled some of its small-commercial-scale facilities for the job. The difficult 12-step synthesis presumably has not been carried out on a regular basis; at least, Carbide says it has not made as much as the 9,000 lb needed to fill the government's order. Distribution of Carbide's output has been handled by John Powell & Co., McLaughlin Gormley King Co. and S. B. Penick & Co., all of whom have been important factors in the pyrethrum business.

McLaughlin Gormley King, however, has added another string to its bow: It is having allethrin manufactured for it exclusively by Benzol Products Co., a Newark, N. J. company set up for this type of manufac-

* This quantity applies to 100% active material; the specs call for at least 75% purity as determined by USDA hydrogenolysis method of analysis. Some allethrin on the market is being guaranteed as not less than 75%; other is being sold as 93%. Thus, the requirements in terms of commercial allethrin may run as high as 12,000 lb.

ture. MGK claims that production by this joint enterprise has been "on a tonnage basis" for the past several months, that plans had been made to double this production prior to the government's move, and that now production will be redoubled. The doubled production is expected early this year, and the redoubled quantity later in the year.

General industry view is that production during 1951 will be modest in comparison to other insecticides. Normal imports of pyrethrum flowers into this country prior to World War II ran 15-16 million pounds (about 200,000 lb active insecticide on a 1.3% pyrethrins basis), which is considerably more than any allethrin in sight at the moment. Other companies, of course, may get into the picture in a bigger way. U. S. Industrial Chemicals, with a big stake in the pyrethrum picture through its Pyrenone (pyrethrum-piperonyl butoxide) insecticides, still has allethrin in the pilot plant, is keeping its own counsel on where it stands.

Dry run: The army has already let one small order for 600 units of the new formulation. This, a negotiated contract garnered by Bostwick Laboratories of Bridgeport, Conn., was more or less a trying-on-for-size operation. After the large order for the 2 million aerosols is placed, others undoubtedly will follow.

Such stimulation in the form of additional demands for allethrin is bound to stir chemical producers to further action. No one has come out yet with plans for a commercial plant. A small one would be inherently uneconomic, and a large one would be very costly. But if the government wants the material badly enough, it can be expected to offer greater inducement than its current program.

Missing Link

Sherwin-Williams places its first Style Guide in nine years in its dealers' hands. It's part of an easy-to-use guide for home decorating that is costing S-W $3 million for its share alone. The complete color service, however, is expected to more than pay for itself in increased paint sales.

The new dealer-aid package will be the "missing link" between paint production and the end customer, for it puts in the dealer's hands the means by which he can intelligently guide customers on related and pleasing color combinations. When a customer asks the average paint dealer for the proper shade of wall covering to go with a turquoise colored carpet, he is tossed a folder of paint color chips, and the dealer, protecting himself, leaves the decision up to the customer.

COLOR SERVICE: Sherwin-Williams fashions sales tool.

S-W's merchandising-minded president, Arthur W. Steudel, has deplored this weakness in the sales setup, thinks his company has the answer in its combination of a long-tested and a new color service comprising three correlated units that give at-a-glance authoritative guidance in home decorating.

The three units are the 1951 Paint and Color Guide, first one issued since 1942; the Style Guide Companion, an entirely new type color combination selector; and the annual edition of the 30-page Home Decorator. All of them used together take the guesswork out of both exterior and interior home decorating.

No penny pinching: The Style Guide, regarded as an authentic color reference book since its inception in 1939, went to dealers last week at $7.50 a copy. It contains 100 pages of full-color illustration on color combinations for the home. The homes used for illustration are a cross section so the guide is practical for a millionaire or the ordinary guy painting on his day off. Total manufacturing costs ran to approximately $15.50 a copy on an initial press run of 75,000, and additional expenses for photographers and color consultants brought final costs up to over $1.5 million.

There are sufficient copies for an average 5 copies to each S-W retail paint outlet. If dealers heed Steudel's advice, the books will be kept in constant circulation among real and potential customers.

The Companion came into being when it became apparent that the Style Book could not be kept within reasonable proportions and provide the customer examples of the wide choice of harmonious colors available for home decorating. It consists of 139 pages, all of different color, determined by analyzing 250,000 sales of S-W interior paint last year, and choosing those most in demand.

The pages are grouped in color harmony so that two pages forward or back of any single page are compatible with the single page, and provide five pleasing color combinations. Cleverly designed windows in the pages bring the companion colors into a close-up view.

Accurate specifications for all the 139 colors are provided by S-W dealers, and every color can be duplicated without guesswork in easy intermixes of standard-sized packages. This not only keeps the customer happy, but eases the dealer's inventory problem.

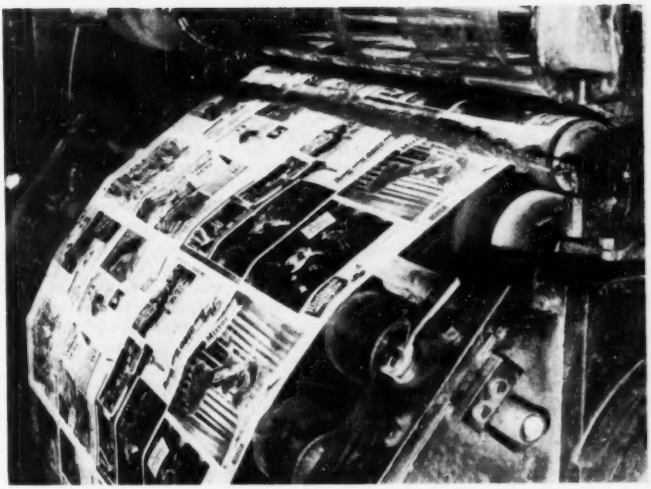
S-W did the complete manufacturing job since it involved applying Super-Kemtone to a full-sized sheet of

heavy paper and cutting out the windows. At least one copy at $25 went to each dealer with his order for the Style Book, and additional copies will go out as available.

The third unit of the color service is the 4.5 million copies of the 32-page Home Decorator which discusses interior and exterior decorating problems in practical terms.

Bread on water: Sherwin-Williams' primary objective in picking up a $3 million tab for the kit naturally was to increase its sales through complete color service. It would be almost impossible to use the Style Book and Companion with some other maker's paint and be sure of getting the colors the books show, for paint makers have their own distinctive names for every shade.

Given these tools, S-W dealers should be able to expand their markets, but the international situation will probably upset calculations somewhat. Shortages are developing daily and there is every indication that such shortages will affect production from time to time at least temporarily on certain items, sizes and colors. S-W will undoubtedly be no worse off than anyone else, and its new link to the customer gives it a big edge if and when conditions are normal.



ROTOGRAVURE PRESSES: Growing thirst keeps ink makers happy.

Roto Revolution

Booming circulations of newspaper supplements and many national magazines printed by rotogravure are boosting the demand for roto inks. The big profit, however, is in specialty applications—soap and cereal boxes, soft drink carriers and plastic table tops are a few—and these are soaking up a lot of ink too. Such mass production requires inks that are cheap, dry rapidly and give high-quality printing.

Although the word "rotogravure" generally stirs up memories of the sepia picture section in the Sunday paper, development of new inks has widened the scope of this system of printing*. Most Sunday supplements are still printed by rotogravure, but use of color rivaling that of the slickest magazines is now a taken-for-granted feature. (In fact, many national magazines, *Colliers*, *Seventeen* and *Parade* among them, are rotogravure productions.) This not only keeps the art director happy, but also placates advertisers who have pressed for colored supplements (and would like to see colored dailies). The quality is much finer than that produced by letter press (conventionally used for newspapers and magazines) and the investment for presses—particularly for four-color work—is considerable less.

More prestige than profit: While a company may find great prestige in supplying ink for the magazine section of a national paper, there is not much money in publication work. Hence, ink makers have been cultivating outlets that can pay more for ink.

A typical new specialty application is linen-like finishes for home or restaurant tables of Micarta, Formica or other plastics. Here paper is printed with roto inks, then treated with a resin solution prior to lamination and curing by heat. These inks are suitable because their resinous bases can withstand the solvents used in the treating process and the subsequent heat and pressure. Wall board in various finishes and tile board for kitchens and bathrooms, now widely used in home construction, also depend on roto-inked patterns which are unaffected by the moisture-proofing finish they receive.

Cartons for household items that have to fight for the housewife's attention on the store shelf are a tremendous market. Duz, Tide, Oxydol, Jello are just a few of the products sold by the millions that owe their colorful packages to rotogravure printing. Cardboard carriers for soft drinks like Pepsi Cola, Canada Dry, White Rock, etc. are covered with rotogravured sales messages. Many breakfast food packages print comic strips, Hopalong Cassidy badges, doll houses in four colors—unheard of before the advent of the new roto inks.

The gift boxes and Christmas wrappings on last month's trash heap carried the residue from probably several millions of gallons of rotogravure ink. Paper drapes, cosmetic packages, department store boxes, aluminum foil, cellophane wrapping, frozen meat wrappers and tomato boxes are a few other items of our current U. S. civilization being coated with designs or messages in rotogravure. The Hershey Chocolate Bar, perhaps a more widely known symbol of Americana than Betty Grable's legs, may switch too; Hershey, whose flint-coated wrapper (carnauba wax) has been one of the premier packaging jobs in the candy industry, is looking at rotogravure.

Up from sepia: The early inks owed their characteristic color to gilsonite which was usually mixed with a little black or red. A typical brown publication ink could be composed of gilsonite, zinc resinate for gloss, para red and a mixture of toluol and textile spirits. Substituting a mixture of carbon black and methyl violet toner for the para red gives a black ink.

Such inks were affected by the mineral oil in the inks of the main sections of newspapers, and caused the supplements to stick to other sections. This led to the use of nitrocellulose in formulations, and the trend toward synthetic resin binders. Today high-quality inks draw on

* The impression is obtained from an etched copper roll. The finished work is of greater beauty than that produced by printing from raised surfaces, and its tonal density can be widely varied. Important in quality work, the screen effect often apparent in half-tone printing is negligible.

nitrocellulose, chlorinated rubber, maleic-modified rosins, phenolics, vinyls, and to some extent shellac. Solvent use has broadened too, the common ones being alcohols, ketones, esters as well as toluol, xylol and naphtha. Combinations of these give the rapid drying characteristics needed in attaining high production rates. Drying is by penetration and evaporation.

Pigments must be soft to prevent damage to copper rolls of the presses, and since the inks as used are very thin, heavy pigments, that may settle out and fill cells in the etched cylinder, are to be avoided. These cylinders are now generally chrome plated to increase wear, and such heavy pigments as ultramarine blue can now be used. Also lithopone, previously ruled out because its free sulfur reacted with the copper roll and gave copper sulfide sludge, is now on the formulator's permissible list.

Roto inks are generally prepared as solutions by ball milling binder, pigment and a little solvent for a period of time, then adding the rest of the solvent, and rolling until completed.

Some emulsion types are used in special applications. An example is manufacture of laminated board where the resins used in solvent inks loosen under the lamination treatment. Protein materials dispersed in the pigments as binders are used in this case.

Little goes a long way: One look at the comics in the Sunday *Philadelphia Inquirer* and a youngster isn't happy with Dick Tracy as turned out by conventional letter press. Such marked superiority is a big part of the swing to roto on consumer packages, but the factor of low cost is equally vital. Roto inks may contain as little as 10% pigment, and even that may be cut to 5% in the press fountain. The amount actually used is so small that tremendous savings in ink costs for high-quality work result despite higher initial cost per gallon of ink. That's the pay-off for ink users that is paying off for ink makers too.

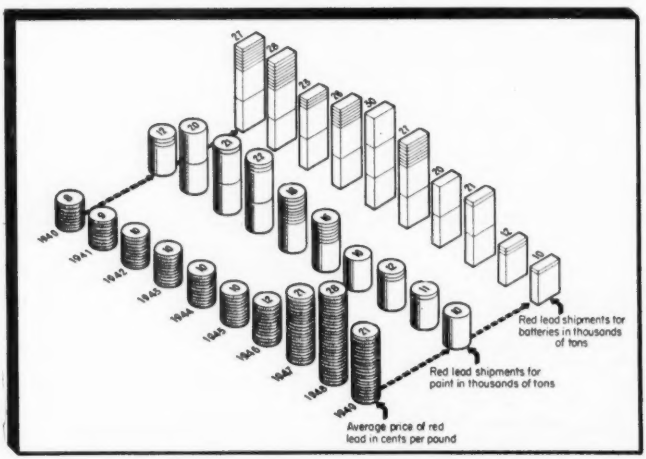
Red Lead Rises

Consumption of red lead, after scraping a 17-year bottom in 1949, was up a healthy 20% last year. Paint and storage batteries accounted for the major share of the rise.

The first nine months of 1950 saw a salutary upswing in the fortunes of red lead, which had declined to a 17-year low the year before. Shipments were up an average 20% during that period (latest data available) —from about 2,100 tons a month in 1949 to 2,520 tons.

Price bugbear: Analysis of the red lead picture indicates that as the price of red lead rises, demand from the two largest consuming industries—paints and storage batteries—slackens. The 1949 low, for example, came at a time when paint and battery consumption were up considerably from the average of preceding years.

With red lead, supply and demand don't determine the price; rather, the price depends on the price of litharge (red lead's basic raw material), which in turn is largely dependent on the rate and productivity of lead mining.



PAINT AND BATTERY MAKERS watch red-lead's price.

The graph shows a continuing decline in red lead consumption during 1945-1948 which would appear to be due to too stiff a price, for those years marked a boom in heavy construction and storage batteries.

Substitutes used: Industry's answer was to turn to substitutes. Battery manufacturers, for example, used 47% more litharge in 1947 than in 1946, while their consumption of red lead rose only 6%. Too, they turned to making more and more lead suboxide —also a red lead substitute—for their own use.

In the paint industry, shortage of red lead during the war gave chromate pigments a foothold.

No crying towels: But before the crying towels are passed around, it should be noted that while storage battery production in 1949 was 80% of 1948's, the industry's consumption of litharge fell to 77%, and of red lead, only to 82%—a clear gain for the latter material. The three-quarters' figures for 1950 show even more substantial gains.

Likewise in paints, chromate consumption declined after the war far more than red lead. Zinc chromate, for example, plummeted from 12,326 tons in 1945 to 2,130 tons in 1946—a decrease of 83% against a red lead decrease of 43%. Recovery is expected, however, as a result of increased military procurement (*CI, December 1950, p. 877*). But shipments of red lead to the paint industry in 1950 were running well ahead of the preceding year and may even double that figure when year's-end statistics are available.

Hard core: Although usage of red lead has not kept pace with its market potentialities, it nevertheless seems to be supported by a hard core of consumers who buy the chemical in preference to other products almost regardless of price. The ceramic industry and miscellaneous users (which include rubber compounders and oil refiners) appear to buy the material in just this way—i.e., regardless of price. This is probably because a comparatively small amount is used in their products.

When the consumption curve for 1950 is complete, its concavity will please the lead industry; but how far the curve will rise, considering red lead's rugged competitors, is strictly for the crystal ball gazers.

non-toxic, non-corrosive, non-volatile

Gluconic Acid

is the choice for acid detergents

Acid detergents are gaining increasing acceptance for cleaning food and beverage containers and equipment because, by leaving surfaces in an acid condition, the amount of proteolytic bacteria is greatly reduced and the development of offensive odors is prevented.

Gluconic acid is the choice for these detergents because: 1.—It has an extremely low corrosion rate, (one-twentieth that of phosphoric acid on iron surfaces); 2.—It is non-toxic, as evidenced by its usage in food and pharmaceutical products, and 3.—It is non-volatile, a factor of importance where high temperatures may be expected.

Odorless solutions of gluconic acid are also being used successfully to prevent the development of milk-and beerstone formation, without affecting the product flavor. For complete descriptions of these and other uses for this mild, inexpensive acid, write for Pfizer Technical Bulletin No. 33.

PFIZER QUALITY

PFIZER

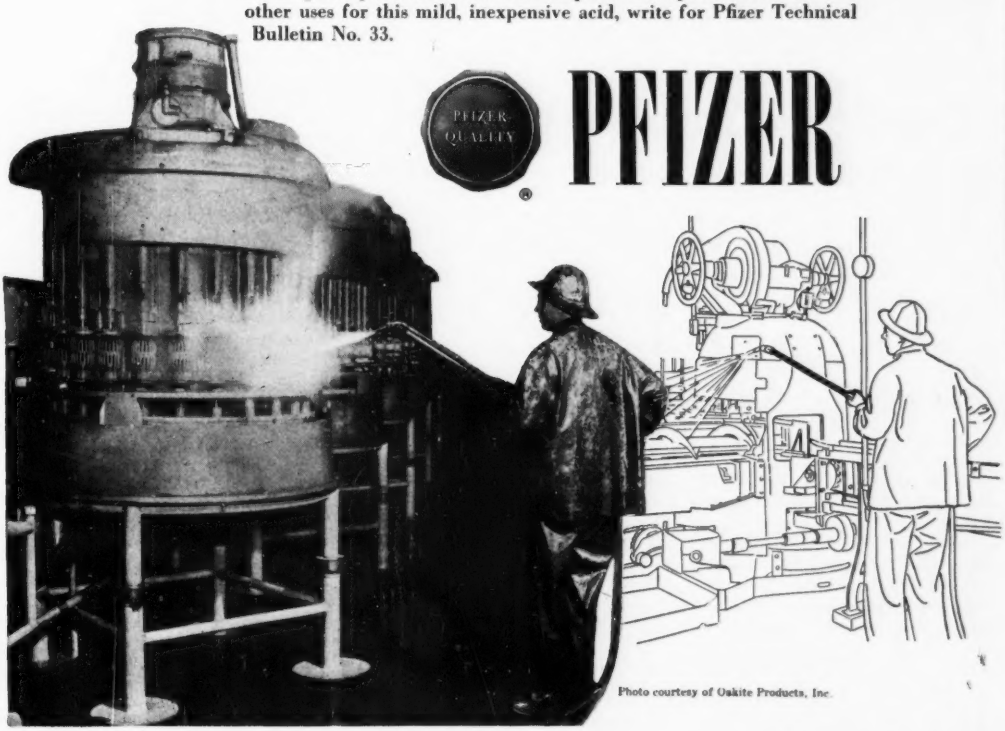
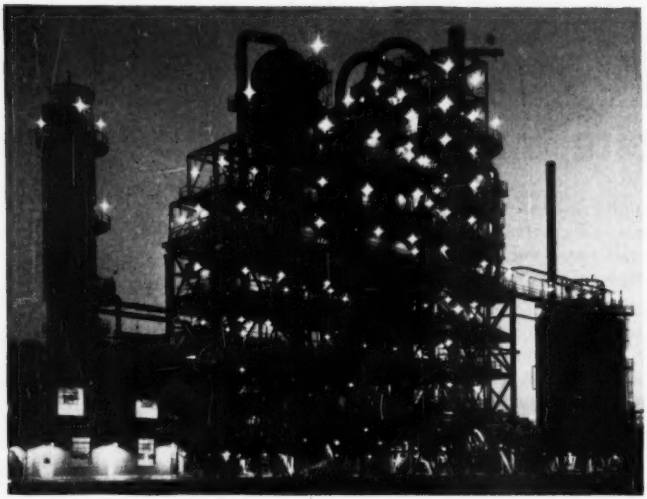


Photo courtesy of Oakite Products, Inc.

GLUCONIC ACID

AMMONIUM GLUCONATE • CALCIUM GLUCONATE • COPPER GLUCONATE • FERROUS GLUCONATE • MAGNESIUM GLUCONATE MANGANESE GLUCONATE • POTASSIUM GLUCONATE • SODIUM GLUCONATE

CHAS. PFIZER & CO., INC., 630 FLUSHING AVE., BROOKLYN 6, N. Y.; 425 NORTH MICHIGAN AVE., CHICAGO 11, ILL.; 605 THIRD ST., SAN FRANCISCO 7, CALIF.



"CAT" CRACKERS: Supplying catalysts for petroleum cracking is a $25 million-a-year business.

"Cracker" Catalysts

Production of catalysts for use in giant petroleum "cat" crackers booms as industry expands from $25 million-a-year for 1950 to $30 million-a-year for 1951.

All types of cracking catalysts are included; fluid cracking catalysts, Thermofor cracking catalysts, and natural montmorillonite-type clay catalysts for use in both types of units. The exception: catalysts for use in the Houdry fixed-bed cracking units.

Plans were being finalized this week for the start of construction of a new fluid-type catalyst plant for Bay Chemical Co. at Weeks, La. (*CIW, Jan. 20, 1950, p. 11*). Construction was moving along rapidly at the new $3,000,000 facility of American Cyanamid Co. at Michigan City, Ind., and National Aluminate Co. is bringing its new plant at Chicago, Ill., up to capacity. Socony-Vacuum Oil Co. is investigating establishment of a new unit for production of Thermofor cracking catalyst at Houston, Tex. Filtrol Corp. has just completed a new unit for production of cracking catalyst by acidification of montmorillonite-type clays at Salt Lake City, Utah.

Up 25%: All of this activity adds up to better than a 25% increase in productive capacity by the end of 1951. Valued at $15 million in 1950 the cracking catalyst business should easily clear the $30 million mark in 1951.

Catalytic cracking: There are three basic types of catalytic cracking processes, Houdry, fluid, and Thermofor. And catalytic cracking is the heart of the modern petroleum refinery, using somewhat under 0.5 pound of Thermofor or fluid catalyst per barrel of hydrocarbon charged to the crackers. These catalysts contain 90% silica and 10% alumina—the silica derived from sodium silicate, or are acidified clays.

In the Houdry process (the first catalytic cracking process) the catalyst is held in a fixed bed and the hydrocarbon vapors to be cracked are passed over the catalyst. These units cannot be operated continuously because of the loss of catalyst activity caused by carbon build-up on the catalyst surface. They must be shut down at intervals to permit regeneration by burning off the carbon.

Primarily because of this latter defect, the Houdry plants are being replaced by moving-bed catalyst plants, using either the fluid process developed by the Standard Oil Development Co., or the Thermofor process, developed by Houdry Process Co. with Socony-Vacuum Oil Co.

Fluid: In the fluid process finely divided catalyst is circulated in suspension in the hydrocarbon stream through a heating zone, is later separated from the cracked products. After separation the carbon-covered catalyst passes to a regeneration furnace where carbon is removed by burning. The regenerated catalyst from this furnace is then recycled.

CIW estimates that production of synthetic catalyst for fluid "cat" crackers, both ground and microspherical, was about 40,000 tons in 1950 from a plant capacity of 47,000 tons per year. Full operation of the National Aluminate plant and completion of the Bay Chemical and American Cyanamid facilities should see this capacity rise to 70,000 tons per year. In addition nearly 15,000 tons of acidified clay-type catalysts were used in 1950 in fluid units.

Thermofor: The Thermofor process is also a moving bed process. It differs from the fluid process in that the catalyst bed passes down a column counter-current to the hydrocarbon vapor. Carbon-covered catalyst is removed at the bottom of the column for regeneration. Regenerated and new catalyst are added at the top. The catalyst removed at the bottom of the column is regenerated by burning off the carbon and raising to the top of the column; by an air lift in the more recent plants or by a bucket elevator in earlier plants. Catalyst loss is primarily by attrition.

CIW estimates that the production of catalyst from Thermofor cracking plants will be running at the rate of 30,000 tons per year by the end of 1951. This figure covers consumption of both acidified clay-type catalysts and of the synthetic catalysts.

New crackers: The petroleum industry quite obviously has plans for a sizable expansion in cracking capacity over the next two years if the market is to expand to use this volume of product. Its expansion, mostly foreign at the moment, will of course lag behind the catalyst plants because of the problem of building up the required working inventory of catalyst before operations can begin.

Undoubtedly the chemical industry will be called upon to expand production capacity for sodium silicate before these plants can be supplied. And this in turn will add a relatively small but noticeable squeeze on soda ash supplies.

A CIW REPORT ON

Acrylonitrile

Acrylonitrile production is booming as a result of the rapid growth in requirements for rubber, plastics, and, more recently, synthetic fibers.

Raw materials affected are ethylene oxide, ammonia for hydrogen cyanide, and acetylene.

Two processes, one based on ethylene oxide and one based on acetylene, vie for better than 100 million pound-a-year market.

Pinch of this increasing demand will be felt most by chlorine, calcium carbide, ammonia, ethylene, and methane.

R. F. Messing & R. L. James*

The present acrylonitrile output, valued at $8-9 million per year, is enough to excite any chemical maker's interest. But of even greater interest is the expected doubling and redoubling of this rate of production within the next five years.

First made in 1893[1] by dehydration of ethylene cyanohydrin from ethylene oxide and hydrogen cyanide, commercial production of acrylonitrile did not begin until the '20s. By 1937 the Germans were using acrylonitrile in quantity to produce Buna-N, an oil-resistant synthetic rubber which is a copolymer of butadiene and acrylonitrile. U.S. production of the monomer began in 1940, at which time it went into a similar oil-resistant synthetic rubber.

PROCESSES

There is only one process in use for the production of acrylonitrile in the United States: dehydration of ethylene cyanohydrin, the same basic process by which it was first prepared in 1893. The hydrogen cyanide required is formed by the acid treatment of black cyanide, although the newer plants form it by thermal reaction of ammonia and natural gas.

Although not in use at present, another process, direct addition of hydrogen cyanide to acetylene, is scheduled for commercial installation.

In addition to these two competitive routes to acrylonitrile, several petroleum companies have attempted to make acrylonitrile by reacting ammonia with natural gas. These processes combine three steps: Some natural gas is thermally converted to acetylene, some is reacted with ammonia to give hydrogen cyanide, and the two products form acrylonitrile. Yields are quite low, and the acrylonitrile is contaminated with many polymeric by-products which complicate purification. While processes of this type may eventually become commercially practicable, indications are that much research is still required.

Detailed information on manufacture of acrylonitrile is not available in the literature despite ten years' commercial production. Some conception of the processing steps involved may be gained by study of the process used in Germany during the war. Using this information as a guide, [2, 3, 4, 5, 6, 7, 8] processes for acrylonitrile manufacture from ethylene oxide and from acetylene can be devised.

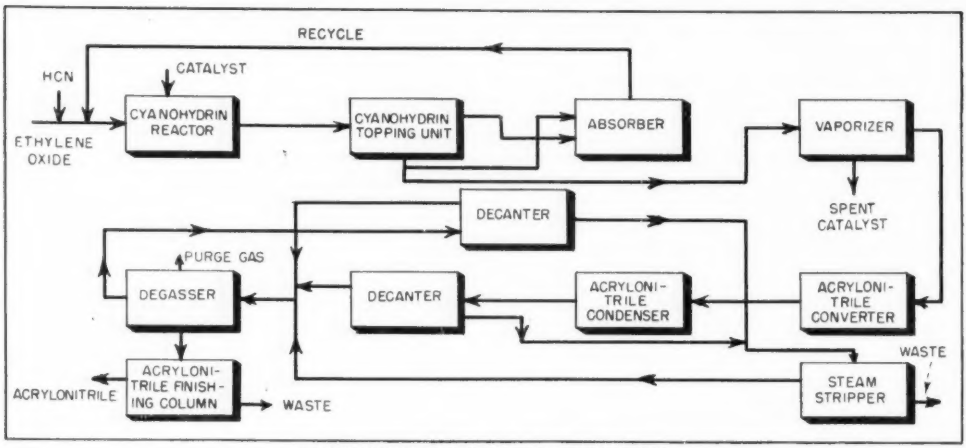
From ethylene oxide: The Germans made acrylonitrile from ethylene oxide by a batch operation. Ethylene oxide and hydrogen cyanide reacted in the presence of an aqueous promoted sodium cyanide catalyst until essentially all ethylene oxide was used up. The time necessary for cyanohydrin formation by this procedure was as much as 10 hours. The cyanohydrin was dehydrated to acrylonitrile in direct-fired batch stills in the presence of 10%-20% magnesium carbonate. The severe thermal conditions gave low yields (60%).

Patents[3, 4] have been assigned to Rohm & Haas Co. describing vapor-phase dehydration of cyanohydrin over activated alumina catalyst at high temperature and reduced pressure. Yields and conversions by this technique are believed to be high, and favorable catalyst life is reported. Vapor-phase dehydration has been assumed in the description which follows. Also, to make the process continuous, the reaction producing cyanohydrin has been interrupted. cyanohydrin removed, and unreacted products recycled.

To produce acrylonitrile equi-molar quantities of ethylene oxide and hydrogen cyanide are introduced into the cyanohydrin reactor. There they are mixed with a solution containing sodium cyanide and diethylamine catalyst. The reactor is sized to give an average contact time of 30 minutes to an hour. The pressure is slightly above atmospheric and the temperature around 140 F. Yields of 85-90% can probably be obtained in the reactor.

Topping frees the product from ethylene oxide and hydrogen cyanide. Part of the cyanohydrin bottoms from the topping units absorbs incoming ethylene oxide and hydrogen cyanide before it is recycled to the reactor. The absorber operates at about 70 F

* *Arthur D. Little, Inc.*
Cambridge, Massachusetts



ACRYLONITRILE FROM ETHYLENE OXIDE

and 10 psig.

The remaining bottoms from the topping unit, containing cyanohydrin equivalent to that formed in the reaction, is vaporized at about 300 F and 100 mm Hg. Spent catalyst is discharged to waste. Cyanohydrin vapors are superheated to about 750 F and passed over activated alumina in the acrylonitrile converter which is operated at about 100 mm Hg.

Hot vapors from the converter are condensed and piped to the decanter. Two layers—a top acrylonitrile-rich layer and a bottom water-rich layer—separate. The top layer is degassed for distillation. Water concentrates in the middle of the column and is removed as the acrylonitrile-water azeotrope, which separates into two layers upon cooling. The acrylonitrile-rich layer is returned to the degasser. The water layer along with that from the first decanter is steam stripped to recover the small amount of acrylonitrile present; this product is also recycled to the degasser.

The bottom from the degasser is fractionated in the finishing column at about 140 mm Hg. The distillate is pure acrylonitrile. The small amount of heavy products is discarded.

Overall yield by this process is estimated to be about 80%.

From acetylene: Acrylonitrile can be made from acetylene and hydrogen cyanide either by a vapor- or liquid-phase reaction. The Germans, however, employed only the liquid-phase technique, probably because yields by the other process were unsatisfactory. Aqueous cuprous chloride was the principal catalyst. In the process described below, liquid-phase processing has been assumed.

Acetylene and hydrogen cyanide are introduced into the reactor at ratios of about 10:1 and contacted at about 190 F with a water solution of catalyst composed of 34% cuprous chloride, 23% potassium chloride and 2.8% sodium chloride. The catalyst life varies from 1 to 6 months when revivified by removal of tar materials.

Hot gases from the reactor are sent through corrosion resistant pipes to be cooled in a water tower to about 105 F. The gases are then sent to a water scrubber where an acrylonitrile solution of 1.5%-2.0% is obtained. A second absorber may be used downstream from the first to reduce acrylonitrile losses. The purge gas from the absorber contains considerable amounts of acetylene, vinyl acetylene and inert higher hydrocarbons.

The bottom from the absorber is piped to a steam stripper which is operated slightly above atmospheric pressure and about 175 F. Vapors from the stripper contain about 5% acetylene, 3% monovinyl acetylene, 4% acetaldehyde, 1%-2% hydrogen cyanide, 3.3% water and about 76% acrylonitrile. These are condensed and piped to a decanter where two layers separate. The bottom layer is recycled to the scrubber.

The top oil layer is sent to a battery of four stills packed with Raschig rings. The packing reduces hold-up time thereby controlling polymerization.

The oil layer first goes to a stripper where the lower boiling materials including the acrylonitrile-water azeotrope are removed. Vapors are passed through an other column the bottoms of which, after separation of water, provide reflux for the stripper. Stripper bottoms are sent to a finishing column where acrylonitrile is removed as a distillate. Bottoms from the finishing column containing some crude acrylonitrile are processed in the still. Heavy bottoms from the crude still are discarded and the overhead vapor recycled to the stripper.

Overall yield by this process is estimated to be about 75%.

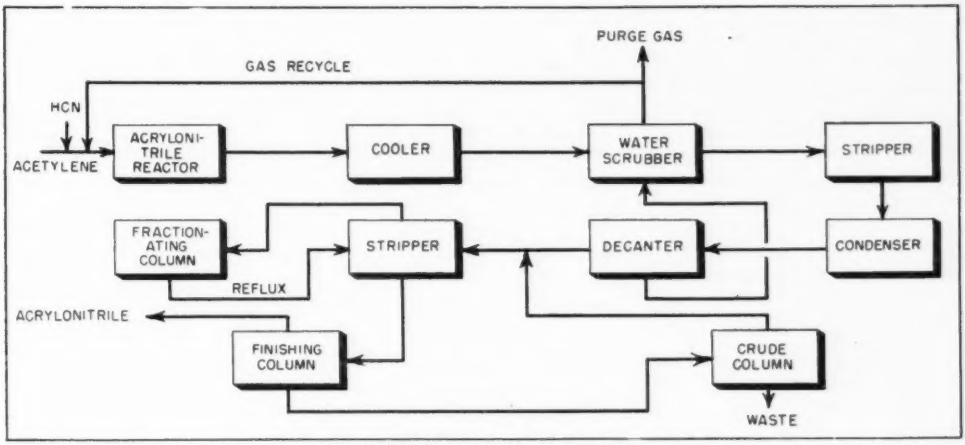
Process comparison: Processes based primarily on German information may differ somewhat from those actually used. However, it is possible from study of them to obtain certain indications of the relative operational and economic merits of the two processes.

Product purification is highly important in acrylonitrile manufacture. Minute amounts of some by-products, acetaldehyde in particular, catalyze undesirable polymerization. Since by-product formation is more extensive by the acetylene route, purification problems are more difficult and more trouble from off-specification product would be expected.

Ethylene oxide as a raw material has an inherent disadvantage in that about 37% of its molecular weight is oxygen, which is removed in the form of water. Theoretical weights needed per pound of acrylonitrile are about 0.83 pound of ethylene oxide, or only 0.49 pound of acetylene. Thus, yield by the process using ethylene oxide may assume more importance than that employing acetylene.

Although production of acrylonitrile from acetylene involves only one step, investment requirement for a plant utilizing acetylene is probably at least 25% greater than for a plant utilizing ethylene oxide. The increase is due to the more elaborate purification equipment required for removing acetylene by-products.

Despite the higher investment, it is probable that economics favor the acetylene process. For a 25-35 million pounds-per-year plant, producing ac-



ACRYLONITRILE FROM ACETYLENE

rylonitrile from acetylene priced at 10¢ per pound, the total production charges (no return on investment) would be roughly 22-25¢ per pound of acrylonitrile. On the same basis the oxide would have to be available at approximately 12¢ per pound, 6¢ per pound under the latest quotation for car lots delivered.

Acetylene produced from natural gas could probably be transferred to acrylonitrile plants for 10¢ per pound or less.

The economic advantages of acetylene over ethylene oxide, of course, remain to be demonstrated in commercial-scale operation, and until this is done the subject will remain speculative. For those companies owning depreciated ethylene oxide facilities, it is quite probable the competition will continue long after the first plant based on acetylene is erected. Furthermore, acetylene production in the future will probably be largely connected with stripped natural gas, which has increased in price considerably over the last three to four years. Ethylene oxide, on the other hand, can be based either on petroleum by-products or on light hydrocarbons stripped from natural gas.

Raw materials: New ethylene oxide facilities are under construction by three major producers:[9] Carbide & Carbon, Dow, and Mathieson Hydrocarbon. As output from these plants reaches the market, supplies should be adequate to meet foreseeable needs in acrylonitrile manufacture.

Adoption of the acetylene route to acrylonitrile has been delayed by the slow development of an economic process to produce acetylene from natural gas.

A demonstration plant for the Wulff process for thermal cracking of hydrocarbons is now under construction near Los Angeles, Cal. Development work on the Oppau and Schoch processes is progressing quite rapidly and Monsanto will install the Oppau (Sachse) process in its new unit at Texas City, Texas.

Hydrogen cyanide is required for both the ethylene oxide and acetylene processes for manufacturing acrylonitrile. The one current acrylonitrile producer is manufacturing hydrogen cyanide from black cyanide. The newer hydrogen cyanide plants, however, react natural gas, ammonia, and air over a platinum gauze catalyst. Combustion of part of the natural gas supplies heat for the reaction.

Hydrogen cyanide from natural gas and ammonia requires much less electrical energy than the black cyanide route. Freight is reduced by elimination of shipment of a bulky solid with a fairly low cyanide content. Ammonia for hydrogen cyanide is produced widely in locations where natural gas is available. Thus it would appear that hydrogen cyanide from natural gas would be the choice for the newer acrylonitrile plants.

Production: There is now only one commercial-scale manufacturer of acrylonitrile in the United States, American Cyanamid Co., Warners, N. J. This unit employs the ethylene oxide route and has a capacity of about 28 million pounds per year. This plant has resulted from enlargements and extensions to the company's basic unit which, until 1949, had a rated capacity of some 13.2 million pounds per year. Actual output has been somewhat under capacity level because of raw material shortages, operating difficulties associated with enlarging plant capacity, and other factors.

Cyanamid obtains most of its ethylene oxide from Jefferson Chemical Co., which Cyanamid owns jointly with The Texas Co. Jefferson's oxide is produced by the chlorhydrin process at Port Neches, Tex. Cyanamid's second major raw material, hydrogen cyanide, is obtained by acid treatment of black cyanide. Black cyanide, an impure form of sodium cyanide, is made in an electric furnace at Welland, Ont., from calcium cyanamide, salt, and coke. Calcium cyanamide in turn is derived from calcium carbide and nitrogen.

As it has developed other calcium cyanamide outlets in fertilizers and as a melamine resin intermediate, Cyanamid has an integrated facility capable of relatively low-cost production, not possible in the smaller unit that would be required for an acrylonitrile plant. The company's calcium cyanamid capacity plant is estimated to be 250-300 thousand tons per year; about 64,000 tons was used as a fertilizer material in the United States during the 1948-49 fertilizer season.

Although Cyanamid's entire production is from ethylene oxide, attention has been given to the acetylene route.[10] Indications are that pilot-plant work on this process has been carried out at Welland, leading to the supposition that Cyanamid might utilize acetylene produced from calcium carbide or from natural gas. Acetylene from calcium carbide should be purer than that from natural gas, but savings in purification would perhaps be offset by higher raw materials costs. Until now Cyanamid has sold virtually its entire acrylonitrile output to other companies for use as a raw material for rubber, plastics, fibers, etc. But a new acrylonitrile-using fiber would result in intracompany use.

DUPONT'S ORLON AT CAMDEN, S. C.: Harbinger of a new industry, polyacrylonitrile fibers.

Rohm & Haas Co. formerly operated a plant at Bristol, Pa., producing about 6 million pounds per year of acrylonitrile, but stopped at war's end because of high production costs. Both raw materials were obtained from outside sources, and production was for enlarged wartime requirements for nitrile rubber. Recently, Rohm & Haas completed a plant to produce hydrogen cyanide from methane and ammonia at Houston, Tex. This $6 million installation is presently devoted primarily to manufacture of acetone cyanohydrin, the intermediate for the company's Plexiglas methacrylate resins. As a result of this production, acrylonitrile manufacture has been frequently rumored, but no definite action has been reported. Rohm & Haas produces neither acetylene nor ethylene oxide, making it dependent upon outside and presumably higher-cost raw material sources. Interest may be revived if low-cost acetylene were to become available in the Houston area.

Du Pont is a third company having past experience in acrylonitrile manufacture. During the war the company operated a relatively small plant at El Monte, Cal., and is reported to have produced a total of 200,000 pounds.[11] This operation was also discontinued when military requirements for nitrile rubber were reduced. Because of its large potential acrylonitrile requirements for manufacture of Orlon fiber, Du Pont must be considered a possible acrylonitrile producer. It is reported that the company has conducted extensive development work on the acetylene process for making acrylonitrile.[10]

Carbide & Carbon is also planning relatively large-scale production of acrylonitrile, both to supply its own needs and for sale to other companies, including Du Pont. Carbide is now constructing a relatively small plant at Institute, W. Va., based upon ethylene oxide.[12] Source of the hydrogen cyanide is not known but may be from natural gas and ammonia by a process similar to that operated by Rohm & Haas. Although Carbide is favoring the oxide route in this first installation, it may ultimately construct a larger acetylene-based acrylonitrile plant at Texas City.

Monsanto Chemical Co. will soon be the largest manufacturer of acrylonitrile. It will construct an acrylonitrile plant based on the acetylene process at Texas City. The reported over-all cost of this plant is $30 million. Monsanto will build a 700 ton-a-day oxygen plant to make acetylene from natural gas by the Oppau (Sachse) process, an oxidative cracking.[13]

On the basis of the reported expenditure, the projected plant capacity would appear to be enormous relative to immediate market demands, with most estimates lying in the range of 70-100 million pounds of acrylonitrile annually.

Another possible entrant into the acrylonitrile field is Mathieson Hydrocarbon Chemical Corp.[14] To date no decision is known to have been reached on acrylonitrile production. Interest here is sparked by the availability of one of the key raw materials, ethylene oxide, from the company's other operations. It is constructing an ethylene oxide and glycol plant at Brandenburg, Ky., and could presumably also manufacture acrylonitrile at that point. Through the parent company Mathieson Hydrocarbon also has synthetic ammonia available which could serve as a raw material for producing hydrogen cyanide for acrylonitrile manufacture.

Other companies have given consideration to producing acrylonitrile because of availability of one of the important raw materials and general interest in manufacture of a commodity whose requirements are being expanded rapidly. Several major oil companies including Phillips, Shell and Sinclair have explored processes for direct manufacture of acrylonitrile from hydrocarbons and ammonia. At least two of the largest producers of ammonia are also believed to have evaluated acrylonitrile manufacture, although no definite action has been taken.

END USES

Relatively few uses account for the bulk of acrylonitrile consumption. At present, it is estimated that about 55% of total usage is in nitrile rubber, 30% in synthetic fibers, and the remainder in plastics and other applications.

Nitrile rubber. The largest traditional use for acrylonitrile has been in the manufacture of nitrile rubber, known as Buna-N or GR-A. It is produced by copolymerizing butadiene and acrylonitrile from mixtures where the acrylonitrile content varies from 20-55%. On the average, the acrylonitrile is about one third of the total weight.

At the beginning of World War II,

nitrile rubber was considered as a general-purpose synthetic to replace and supplement natural rubber. But acrylonitrile was much more expensive than styrene and the butadiene-styrene combinations, GR-S, were adopted. Use of nitrile rubber was restricted to applications requiring its special properties, particularly oil resistance.

The rapid war growth in Buna-N manufacture is shown in the accompanying table. Nitrile rubber production reached only a small fraction of the peak output of GR-S, which reached 719,000 long tons in 1945. At the end of the war, when military requirements declined, Buna-N production dropped to about one-third of the peak volume. Most of this decline has since been regained. Production of nitrile rubber in the first six months of 1950 amounted to 7,569 long tons, and production for the entire year probably approached 16,000 long tons.

Assuming that acrylonitrile comprises a third of total weight of nitrile rubber, its requirement during the peak wartime years amounted to about 12.4 million pounds. Based on the indicated production in 1950 of about 16,000 long tons, acrylonitrile usage is estimated at 11.8 million pounds. Available evidence indicates a favorable growth pattern for nitrile rubber for the next several years, although butadiene supply may restrict the projected growth.

The four major producers of nitrile rubber have an estimated capacity of over 20,000 long tons per year. The manufacturers, in order of estimated size, and trade names are shown below:

The B. F. Goodrich Co.	Hycar
U.S. Rubber Co.	Paracril
The Goodyear Tire & Rubber Co.	Chemigum
The Firestone Tire & Rubber Co.	Butaprene

The principal uses of nitrile rubber have been in products requiring oil and gasoline resistance. During the war large quantities were used in self-sealing linings for gasoline tanks in military aircraft. Rubber pipelines for transfer of fuel from tankers to naval vessels also were an important outlet for nitrile rubber. Nonmilitary demands have centered principally in engine mountings, gaskets, gasoline hoses, and other molded products.

The main disadvantages of nitrile rubber are its relatively high cost and susceptibility to oxidation. Nitrile rubber now sells for 43-50¢ per pound, GR-S for 24-25¢ and neoprene for 35¢. In general, nitrile rubber is used where discoloration is not critical. Neoprene has many characteristics similar to nitrile rubber, and has the advantage of lower cost and fire resistance, although it is not as resistant to solvent attack.

Although mechanical rubber goods probably account for the largest portion of nitrile rubber production, latices have become increasingly important. These water dispersions are used for impregnation of paper to improve strength and provide outstanding grease resistance. Oxidation resistance is, of course, important in considering use of nitrile rubber for such purposes.

Nitrile rubber may be combined with vinyl chloride resins to produce a blend such as is marketed by Goodrich under the trade name Polyblend. In such mixtures the rubber acts as a softener or plasticizer for the resin, and has the obvious advantage of being permanently incorporated. Thus the possibility of plasticizer migration from the resin to other articles is eliminated. These nitrile rubber-vinyl mixtures have been employed in the packages used to knead color into margarine as well as for sausage, cheese, and butter wrappers. Because plasticizing efficiency is somewhat lower than that of monomeric types, however, the most suitable applications are those where reasonable stiffness is permissible. One source has predicted that 40-60 million pounds of nitrile rubber will ultimately find an outlet in mixtures with vinyl resins.

Another comparatively new use for nitrile rubber is in mixtures with phenolic resins to produce materials having a high degree of shock resistance. The toughness of such resins together with resistance to fatigue and vibration has led to their application in such products as tool handles, machine fixtures, and shoe soles. Resins containing 70% phenolic and 30% nitrile rubber may be molded into articles with ebonite hardness, useful in such products as trays and tote boxes. Formulations of phenolic resins with nitrile rubber have also been suggested for use as adhesives, notably for plywood, although adoption has been slow because of cost considerations.

Synthetic fibers: The prospective production volume of synthetic fibers threatens to overshadow all other acrylonitrile uses. Three major chemical companies have already begun limited-scale production of fibers containing acrylonitrile and are laying plans for rapid extension of these facilities. Other companies are known to be investigating the manufacture of acrylic fibers based entirely or partially upon acrylonitrile.

Du Pont appears to be most advanced, and is now producing essentially 100% polyacrylonitrile filament under the trade name, Orlon. The initial plant constructed at Camden, S. C., is reported to have production capacity of 6.5 million pounds of fiber annually. The initial filament plant expenditure has been reported at $17 million, in addition to $5 million spent on research to develop the fiber. The method of manufacture involves spinning from a solvent reported to be dimethyl formamide.[10]

This first product will have limited dyeing characteristics, making it most suitable for fabrics where strong colors are not required. Fabrics woven from Orlon filament have a silk-like hand, suggesting their use in apparel such as lingerie, and satin and taffeta dress goods. Ability of the fiber to withstand washing and its shrink and crease resistance will help to promote use in these areas.

Orlon's resistance to chemical attack and to weathering makes it highly useful in several industrial fields. Some possible outlets of this character are dust collectors, filter cloths, acid-resisting clothing, anode bags, and water softening bags. Weathering resistance together with moth and mildew resistance has also led to application of the filament in curtains, awnings, auto tops, garden furniture, and umbrellas. Orlon is now priced at $2.85 to $3.35 per pound.

Construction is already under way on a new plant to be completed in early 1952 to produce Orlon staple fiber. Investment in this facility is expected to be $15 million, which should at least double the present rate of output. Orlon staple will be more readily dyeable than the filament, and is expected to have broader markets. The material represents a

PRODUCTION AND CONSUMPTION OF NITRILE RUBBER
(Long Tons)

	Production	Consumption		
		Domestic	Export	Total
1941	2,464	1,688	...	1,688
1942	9,734	8,217	160	8,377
1943	14,487	12,405	631	13,036
1944	16,812	14,112	557	14,669
1945	7,871	8,029	406	8,435
1946	5,738	5,988	797	6,785
1947	6,618	4,536	755	5,291
1948	7,012	5,771	885	6,656
1949	11,072	8,827	1,574	10,401
1950 (6 months)	7,569			

Source: Rubber Division ODC, U. S. Dept. of Commerce

close approach in physical properties to wool, although it is obviously chemically dissimilar from wool, which is proteinaceous. Orlon staple is warm to the touch, relatively lightweight and, like the filament, is washable, crease resistant and shrink resistant. These characteristics make it of interest in the regular weight suit trade.

Garments have been fabricated which retain a crease even after repeated washings and use by the wearer over a considerable period of time. Shirts and sportswear may also represent a possible outlet for Orlon staple, although here it will be competing with the much less expensive cotton, and thus would likely find only a limited market. Because of inflated wool prices now at the level of about $3.00 per pound, Orlon is of most interest in areas where it will replace or augment wool.

Plans are being made by Du Pont for further plant extensions which will significantly increase the originally projected output. The company is reportedly planning to manufacture 30-40 million pounds of Orlon within the next two to three years.

Carbide & Carbon is manufacturing dynel fiber, which is similar in many respects to Orlon. Dynel is a polymer containing 40% acrylonitrile and 60% vinyl chloride, and about 1-2 million pounds annually is being produced at the company's South Charleston plant. The present facility is expected to reach peak production in January, 1951, and additional units are under construction. Dynel is made by dissolving the polymer in a solvent and extruding, similar to acetate rayon and Orlon.

Carbide's current production is limited to staple fiber and tow, which are now priced at $1.25 per pound. The fiber is reported to have good dyeing characteristics. Incorporation of vinyl chloride also makes it fire resistant. However, the thermoplasticity of the fiber poses some problems in ironing. Thus most of the current output is planned for knit goods which are customarily not ironed. Weather resistance may not be so great as for the 100% acrylonitrile fibers, although it is suitable for many fabrics not encountering direct exposure to sunlight. Most present production is going into industrial cloth and work clothes, as well as into blankets, draperies, upholstery, and other knit goods.

The third major acrylic fiber is Acrilan which Chemstand Corp. will produce at its new plant near Decatur, Ala. No definite information is available on projected plant size, but one source has indicated an investment of $100 million.[17] Only a portion of this total will be invested in the initial plant facility, however. Chemstrand, jointly owned by Monsanto and American Viscose, is producing 1-2 million pounds of staple per year in a pilot plant facility at American Viscose's Marcus Hook plant. This output will enable market testing and development before the larger quantities which would be produced at the Alabama site reach the market.

No detailed information on the composition of Chemstrand's fiber has become available, although one report suggests that its composition will be 85% acrylonitrile and 15% vinyl acetate. It is believed that its properties will be generally similar to those found in Orlon and Dynel, perhaps lying in an intermediate range.

Several other companies are known to have conducted investigational work in the area of synthetic fibers, although their plans have not crystallized. Industrial Rayon Corp. has carried out laboratory work on such synthetic fibers and American Cyanamid has a polyacrylonitrile fiber under development.[16]

The extensive interest and major investment being placed in the acrylic fibers of course necessitates a large increase in requirements for acrylonitrile itself. Many industry observers believe that acrylonitrile used in fibers alone will amount to 100 million pounds within the next few years, and may ultimately reach 250 million pounds. When these figures are compared with the current output of rayon, about 1.2 billion pounds per year, and with the production of natural fibers including wool and cotton, only a relatively small portion of the fibers market need be obtained to reach these levels.

It should be remembered, however, that a substantial portion of rayon output is used in tire cord where it has particular applicability. Furthermore, price considerations would appear to rule out the new synthetic fibers from the largest volume markets which are held by cotton, so that the main area of competition would be with wool. Production of wool this year is expected to be of the order of 250 million pounds, although it has averaged 300-400 million pounds per year in the past.

Other uses, which have accounted for a moderate consumption of acrylonitrile, are in plastics and fumigants. Several companies, notably Dow, U. S. Rubber, and Goodrich, have carried out extensive work on polymerization of various monomers to derive plastic and rubber-like materials. Dow is selling a polymer of vinylidene chloride and acrylonitrile under its Saran F-120 trade name. This material has outstanding resistance to water and moisture vapor transmission, making it applicable in the form of film for packaging. Coatings produced from the resins are impervious to oil, greases, acids, and alkali, and have good prospects for use in food and drug containers.

American Cyanamid has begun limited production of an acrylonitrile derivative, dioxypropionitrile, useful for selective extraction of aromatic compounds from paraffins. This compound is derived from cyanohydrin or acrylonitrile.

Acrylonitrile has also been used successfully as an insecticide and fumigant in flour milling but total consumption for these uses has remained relatively small.

Price trends: Acrylonitrile price quotations first appeared during January, 1947, at which time the product sold for 25¢ per pound. In February of that year the price was raised to 28.5¢; in September 1948 it became 32.5¢; and in April, 1949, 35¢. The current price, which was released in April, 1950, is 39¢. Thus, in approximately three years an increase of about 56% over the original price has developed.

While projecting future price trends —especially in the present economy— is difficult, the new plants and processes which will be operated should reduce the price. At the present, competition for acrylonitrile sales is practically nonexistent, but with Monsanto and Carbide & Carbon definitely entering the field, serious competition may arise in the relatively near future. Perhaps a stable level of about 30¢ per pound will develop. At this price, even with the present high cost of equipment, it should be possible to obtain fair profits on plants falling in the medium- and large-size capacity range. However, new corporate income tax and excess profits tax could be large enough to offset price decreases which might otherwise occur.

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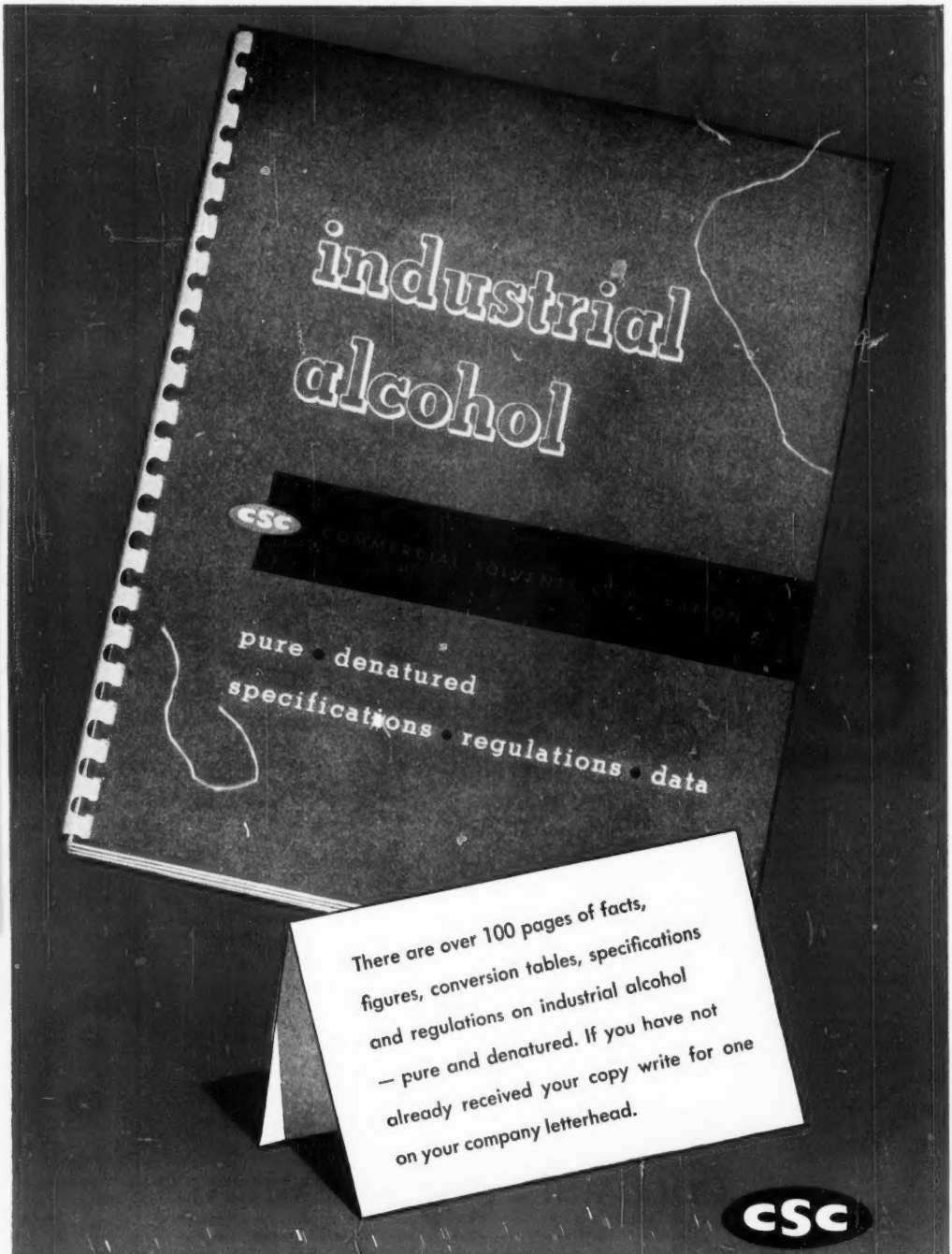


COMMERCIAL SOLVENTS CORPORATION • 17 EAST 42nd STREET, NEW YORK 17, N. Y.

MINING PHOSPHATE ROCK: Latent dollars in a public nuisance.

Rock Fluorine

Research project now under way at the University of Florida will seek means of recovering valuable fluorine from phosphate rock. Some of it is recovered from stack gases, but most of it remains in the fertilizer or slag. Current rapid depletion of the high-grade Kentucky-Illinois fluorspar deposits adds a commercial fillip to the research investigations.

In the phosphate ore mined each day in Florida, which produces about 70% of the country's phosphate minerals, there is a total of about 1 million lbs. of fluorine. Figuring pure calcium fluoride at $40 a net ton and the fluorine content about 50 per cent, the paper value of fluorine in that form is about $40,000 a day. As hydrogen fluoride it would be worth about $160,000 a day. In the form of fluorocarbons and their derivatives the potential value is much higher and impossible to estimate, as the market price of the fluorocarbons has not yet been stabilized.

This is the motivation for the research program recently started by the Engineering and Industrial Experiment Station of the University of Florida under the direction of Dr. J. H. Simons, well-known expert in fluorine chemistry, until recently director of the Fluorine Laboratories at Pennsylvania State College.

Comments Dr. Simons: "If we guess that prices of fluorocarbons will average $3 per pound, then the daily output of fluorine from Florida's phosphates would produce $3,000,000 worth of product in this form."

Fluorine is found in all of the Florida phosphate deposits. It amounts to about 3.5% of the ore on an average and is in the form of calcium fluophosphate and calcium fluoride. It ends up chiefly in finished fertilizer and is distributed widely and irretrievably, or it remains in the slag of certain processes, or it is discharged into the atmosphere from the plant stacks.

Some of the latter is recovered from the stack gases so as not to create a public nuisance. But most of the fluorine is irrevocably lost. "In order to recover most of it as a reliable product, more research needs to be done," says Dr. Simons.

Research at the University of Florida will be concerned not only with the academic and theoretical aspects of the recovery of this wasted fluorine, but also, through industrial sponsors, the commercial aspects.

Companies mining phosphate rock and pebbles are interested in removing the fluorine, even if there were no commercial market available for it; for the phosphate compounds are much more valuable without the fluorine present than with it. Moreover, even as its cheapest compound in the phosphate deposits, the fluorine is worth roughly half as much as the phosphorus. In the form of hydrofluoric acid the value would be much greater.

Present market for fluorine compounds is supplied largely by imported ore or by high-grade deposits in Illinois and Kentucky, which are showing signs of depletion. Major market for fluoride compounds lies in the growing use of hydrogen fluoride as a catalyst for organic chemical reactions, particularly the alkylation step in the production of gasoline. According to Dr. Simons, the fluorocarbons and their derivatives give promise of a future market of large size for fluorine compounds. "The potentialities of this future market," says Dr. Simons, "are so great that all of the fluorine at present mined in Florida would not be sufficient to meet the demand."

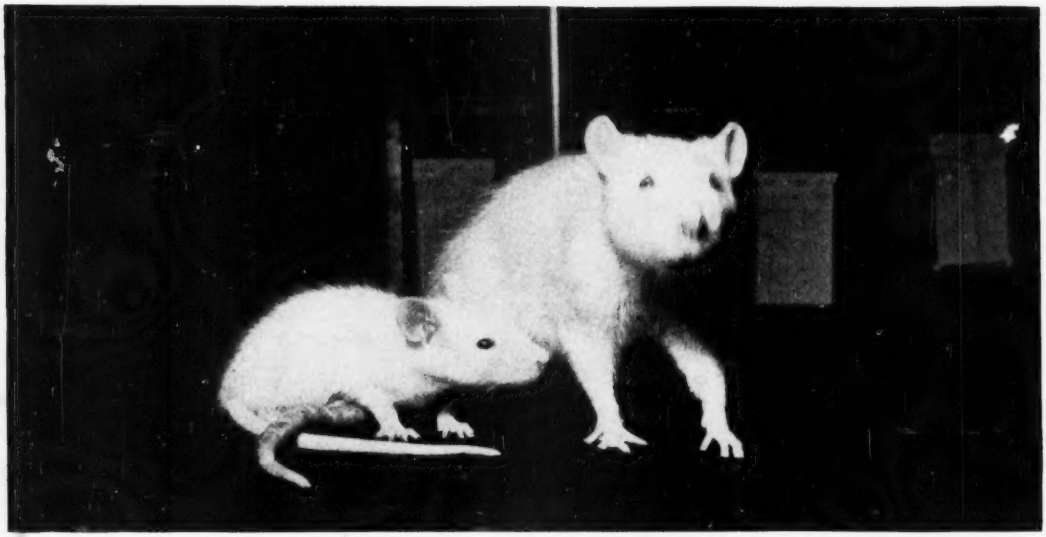
Silica Flattener

A matte finish on furniture is produced by incorporation of Davison Chemical Corp.'s non-organic flatting agent in lacquer. It's the latest entry in a market already represented by similar products of such firms as Monsano and Linde Air Products. Their selling points: Economy and positive gloss control.

Accomplished by the use of synthetic silica and the exclusion of organics which sometimes cause film deterioration, the clear, velvety finish produced is currently in high popular demand. This type of finish was obtainable before only on costly, hand-rubbed furniture, but it tended to gloss up under the polishing action of normal use. Lacquers containing the new Davison Chemical Corp. product, dubbed Syloid 308, will give a long-lasting, fashionably dull effect without tedious and expensive hand craftsmanship.

Secret: Uniformly high flatting efficiency and mill loading (ready mixing in the mill with other lacquer constituents), resulting from controlled silica particle size, guarantees proper degree of durable matte finish.

Newest β-keto ester available for industrial development is Monsanto's diethyl acetylsuccinate. A clear water-white liquid, the compound joins oxalacetic and acetoacetic esters as a representative of a highly versatile class of organic intermediates. Obtainable only as research samples, diethyl acetylsuccinate reacts with hydrazines to form pyrazolone dyestuff intermediates; substituted phenols to form fluorescent coumarins. Other uses: preparation of hetero-cyclics.



1 VITAMIN D made all the difference between these two rats. The healthy one always has had plenty, while the little fellow—deprived of the vital nutrient for several weeks—is a suitable candidate for recovery on a test diet of fortified milk.

RESEARCH . . .

How Rats Help Vitamin Assay

Foster D. Snell, Inc.'s new laboratory at Bainbridge, N. Y., will house its recently acquired Supplee Laboratories division. Devoted to nutritional assays and toxicity studies on various products, a major function of the laboratory is testing vitamin D-fortified milk to see that it conforms to legal standards.

A well-known name and a well-bred rat colony were among the assets Foster D. Snell purchased last year from the heirs of George C. Supplee, famed milk researcher. In the new building now nearing completion, the colony will be put to work determining how well U. S. dairies live up to the "XXX units vitamin D per quart" printed on their

4 VITAMIN D-FREE DIET is prepared from wheat gluten and a special type of corn. Distilled water is only fluid in diet.

5 LUCKY THREE of nine rats get fortified milk; another lucky three get cod liver oil; remainder get no vitamin D.

2 MILK SAMPLES, seized from client dairy, are delivered by expressman to Wilma Doolittle, assistant chief bacteriologist.

3 TEST RATS, of a docile strain bred uniformly since 1928, are kept in sunless room and fed D-less diet to produce rickets.

bottle caps. Already, in its old rented quarters, the laboratory has tested milk samples from as far away as Florida and Kansas City.

Samples seized: The various state boards of health have similar legal requirements governing claims of vitamin D enrichment in milk. Most of them require that two samples a year from each dairy must be certified by an independent laboratory. The board itself may seize a random sample and send it to the laboratory designated by the dairy, or the laboratory may authorize the Railway Express Agency to seize one.

There is no chemical test for vitamin D. The only analysis, therefore, is biological assay—determining what good the milk will do a vitamin-deficient rat. The rats are kept in a sunless room and fed a vitamin D-free diet for several weeks, until they develop rickets. When a milk sample comes in, a "panel" of nine rats is selected—three get measured quantities of the milk, three get a standard vitamin D dose in the form of U. S. P. cod liver oil, and the rest (controls) keep their rickets. After six days, during which the rats' diets and weights are carefully measured, the creatures are killed. Microscopic examination of the damaged bones reveals how much bone replacement has taken place, permitting a quantitative evaluation of the rats' vitamin D intake.

6 EXAMINATION of rats' thigh bones at conclusion of test shows how milk stacks up against standardized oil.

7 CAREFUL RECORDS are kept throughout test period and data are cross-checked. Results are incorporated into report.

RESEARCH . . . . . .

Wet Comparison

Oxyphen, a new testing paper, permits accurate estimation of pH to 0.1 unit. How it's done: Indicator and standard color are matched on same wet strip, eliminating sources of error inherent in comparison with dry standards.

Success of the product is due to its common-sense operating principle. In the past, the chief drawback of testing papers has been the difficulty of translating final indicator color into pH units. Accomplished by comparison to known standards, this task, subject as it is to normal human fallibility, is further complicated by the necessity of comparing a wet indicator color to a dry standard color. Although reasonably good workaday results may be obtained in this manner, the use of pH paper is at best an approximation.

Standard on strip: Oxyphen attacks the heart of the problem and puts the operation on a more business-like footing. Both indicator and standard colors are printed in bands on the same strip of test paper—a different color for each pH value. The strip is totally immersed in the solution and the resultant wet indicator color is matched with the wet standards to give a pH reading. In this way, all colors are wetted simultaneously and by the same medium. As a result the paper is especially valuable for determinations of murky and colored solutions, since visual interferences and most sources of error are held constant for both indicator and standards.

The product makes use of a universal indicator and is available in graduations of 0.2 and 0.3 pH unit. Estimation to the nearest tenth of a unit is claimed. All colors on the strip are stable to light and will not diffuse on wetting.

Largest user of Oxyphen is the plating industry where previously difficult measurement of colored metal salt solutions, dyebaths, plating baths, etc., is now simple, rapid, and accurate. It may also be used with peroxide bleaching baths of any concentration although not recommended for other strong oxidizing or reducing solutions. Development of special papers for this and other stringent applications is now under way and their appearance on the market is only a matter of time.

Manufactured in Switzerland, the paper is the inspiration of a university professor with a classic scorn for the limelight. Commercial development and sales are handled by the J. Einstein Co. of Forest Hills, N. Y.

Neo-Fat D-242 a low-cost quality rosin replacement

Neo-Fat D-242 is a low-cost fractionally distilled product for use in formulas where rosin has been used. Neo-Fat D-242 is a mixture of rosin acids and valuable fatty acids—approximately 70% rosin acids and 30% fatty acids. The fatty acids present are linoleic and oleic acids in almost equal proportions.

In the protective coatings industry, Neo-Fat D-242 can be used in such formulations as modified ester gums, phthalic alkyds, straight or modified with additional fatty acids, P. E. esters, etc.

Neo-Fat D-242 is well suited for soap manufacture. It is readily soluble in fats, oils and other fatty acids and, therefore, offers no difficulties in those formulas in which a rosin product is customarily used. Saponification is almost instantaneous as with all fatty acids.

There are many other applications for these fractionally distilled acids including core oils, linoleum, floor covering and greases. Neo-Fat D-242 is also an excellent product in the preparations of asphalt emulsions.

Neo-Fat D-242 is available in 55 gallon drums and in tank cars. Write today for additional information. Free samples will be furnished on request.

Arquad 2HT excellent cationic textile softener

Armour's Arquad 2HT is a new cationic softener developed for use in textile finishing plants and hospital linen supply and diaper laundries. It produces a full, soft handle with maximum lubricity and minimum reduction of absorbency.

As a cationic-active softener, Arquad 2HT is substantive to textile materials and can be readily exhausted onto cotton, rayon and wool from a long bath. As a result, Arquad 2HT can be applied most economically in the mill or laundry and the full value obtained.

Arquad 2HT is a distearyl dimethyl ammonium chloride. Its outstanding softening properties appear to be due to the presence of the two long fatty chains in the molecule. Arquad 2HT carries a positive charge which is naturally attracted to the negatively charged fabric. This leaves the fatty end exposed to contribute its qualities to the "handle" of the goods.

Arquad 2HT is compatible with certain finishing agents such as starches, dextrins, glue and gelatin. It can also be applied with most urea-formaldehyde and melamine-formaldehyde resin finishes including the new acid colloid resins.

Arquad 2HT is sold in 75% active concentration . . . packed in specially lined open-head drums holding about 400 pounds. Write today for additional information, pound samples, as well as price quotations.

LOOKING FORWARD

N — alkyltrimethylenediamine

$$RN(H)-CH_2-CH_2-CH_2-NH_2$$

The Armour Chemical Division now offers N-alkyltrimethylenediamines which will be marketed under the trade name DUOMEENS. They exhibit the properties and characteristics of both primary and secondary amines of the general formula shown above. The length of the carbon chain in the alkyl group varies from 12 to 18.

DUOMEENS have stronger cationic properties than corresponding primary amines and have been used in conjunction with cationic emulsifiers in the preparation of resin emulsions in which the oil phase is exhausted onto paper, fibre, fibre board.

DUOMEENS are suggested for possible research in modified alkyds and as a modifier in condensation type resins.

If this new chemical group suggests a possible new development to you, we will be pleased to send you a sample, without charge, of course, for your experimentation.

New booklet offered on Quaternary Ammonium Compounds

Arquads is the trade name given to a series of quaternary ammonium salts manufactured by the Armour Chemical Division. Members of the series vary as to the length and number of long-chain alkyl groups attached to the nitrogen atom.

The booklet contains data on physical and germicidal properties, average composition, compatabilities and the wide range of Arquad applications. Write today for your free copy.

Neo-Fat 11 (90% Lauric Acid) Produced by Fractional Distillation

Armour's Neo-Fat 11 is the answer to your problem requiring a high purity lauric acid. You are no longer forced to buy a mixture of nine coconut oil fatty acids in order to secure the one you really want. Armour's fractional distillation process produces Lauric acid with concentrations of 90% or above.

Neo-Fat 11 and its derivatives may be used in detergents, wetting agents, metallic soap, shampoos and shaving creams. Neo-Fat 11 may also be used in alkyd resins, plasticizers, pharmaceuticals and as intermediates in a number of other synthetic organic compounds.

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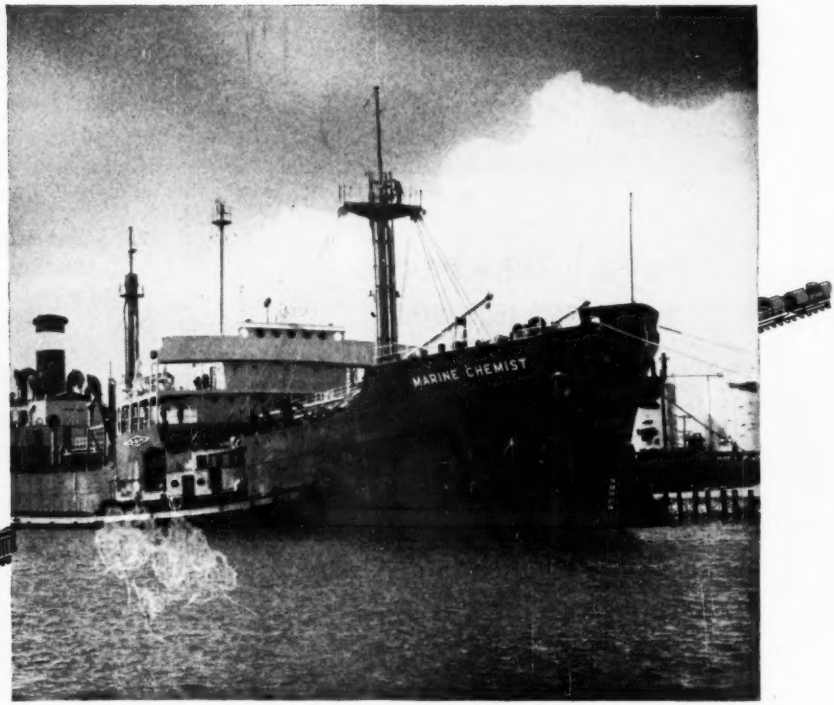

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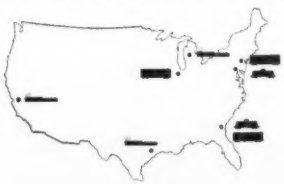


DOW

CHEMICALS

INDISPENSABLE TO INDUSTRY AND AGRICULTURE

PRODUCTION . . .

Budgeting Maintenance

Maintenance budget can be estimated more accurately from estimated power use than from previous records.

Management's production estimates give a quick prediction of power use which is then weighted by other factors.

Steam and water consumption are possible alternatives but they vary more widely with outside temperature changes.

A new method of budgeting plant maintenance was put forward this week by Dave Pierce, chief engineer of General Aniline & Film Corp., at the Plant Maintenance Show in Cleveland.

Pierce's formula uses process power consumption to estimate and budget maintenance cost for a future interval of time. It goes without saying, of course, that the engineer must differentiate clearly between the kind of expenses to be capitalized and those chargeable to expense—i.e., maintenance.

Three categories: The latter costs can be pigeon-holed into three categories: actual repairs and maintenance; alterations, relocations and dismantling; and service—which includes routine inspections, yard cleaning, window washing and the like. In general the three divisions respectively account for 75%, 15% and 10% of the total cost.

Four elements: Previous plant history of four cost elements must be studied before an adequate system for maintenance budgeting can be set up: cost of materials used; manhours of labor required; average pay rate; and rate of overhead.

First two of these items vary in a given plant almost directly with electric power consumption. This empirical generalization is based on 15 years' operating records of General Aniline's plants and a study of similar data from several other companies. Average deviation from the mean is just over 10%.

The other two elements bear no simple relation to power use. They must be calculated each year as a matter of record and for use in explaining year-to-year changes in total maintenance cost.

The budget: Relationship of various cost elements in calculation of the budget can be most simply expressed by a formula:

$$c = x(a + by),$$

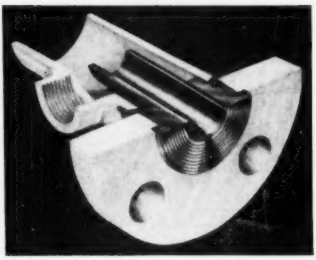
where c is the dollar budget for plant maintenance for any desired period; a, the material index, is expressed in dollars per 1,000 KWH and is a constant chosen as applying to that period; b is the labor index—another constant in terms of man-hours per 1,000 KWH; y, in dollars per man-hour, is the average pay with overhead, estimated from actual past figures; and x is the estimated power consumption in thousands of KWH.

The two constants, a and b, are obtained by a study of the indexes for several years past. If there is no marked variation, the average value can be used. If there is an upward or downward trend, charts can be made up (preferably by quarters) and the current value extrapolated from them.

DAVE PIERCE: The electric meter tells the story.

Less Alloy Needed

Corrosion resistance at 40-70% of the cost of all-alloy units is provided by Martin-Quaid Co.'s new Econalloy heat exchanger. In other exchangers the whole unit is constructed of the required corrosion-resistant alloy. But in the new design only the parts ac-



ECONALLOY HEAT EXCHANGER FLANGE: Serrations and a special tool permit assembly without heating.

tually in contact with the fluid being heated or cooled (the inner tube and flange inserts) are manufactured from alloy. Any commercially available alloy may be used: stainless steel, Inconel, Monel, Hastelloy, nickel, etc.

Double pipe: The corrosion-resistant inner tube in the new double-pipe heat exchanger is attached to the external steel tube without welding. The alloy inner tube is expanded by special tools into prepared serrations on the inside of the end flange. No heat is required to form a positive joint; thus there is no chance for the grain structure of the alloy to change and modify its corrosion resistance.

Double-pipe construction permits Econalloy exchangers to be used as an integral part of process piping. The design also eases tube cleaning and makes it a simple matter to increase capacity.

The Econalloy line is furnished in sizes ranging from a fraction of a square foot of heating surface to several hundred square feet, in lengths up to 30 feet per segment. Internal tube sizes range from ¼″ to 4″ and are capable of handling pressures up to 900 psi and temperatures of 700 F.

Analog Aid

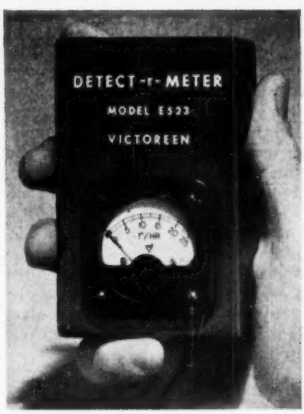
A new analog computer, developed for making rapid estimates of the performance of rocket fuels, will save much time for industry in the laborious process calculations needed to study high-temperature reactions.

The new computer, a hookup of Wheatstone bridges, is a development of the U. S. Naval Ordnance Test Station, China Lake, Calif. A compact and versatile version has been engineered and fabricated for the Navy. It is now available from Analytical Instruments Co.

Know three to find one: Two Navy chemists, Sol Skolnik and William S. McEwan, realized that where no more than three kinds of molecules occur in a single independent equilibrium, it would be simple to assign a relative resistance on a Wheatstone bridge to the values of the equilibrium constant and concentrations of the three components. With three of these variables known, the fourth can be quickly determined simply by balancing the bridge. In high-temperature gas reactions, no more than three molecular species occur in a single independent equilibrium (and if more complex equilibria occur they can always be resolved into simpler three-body equilibria).

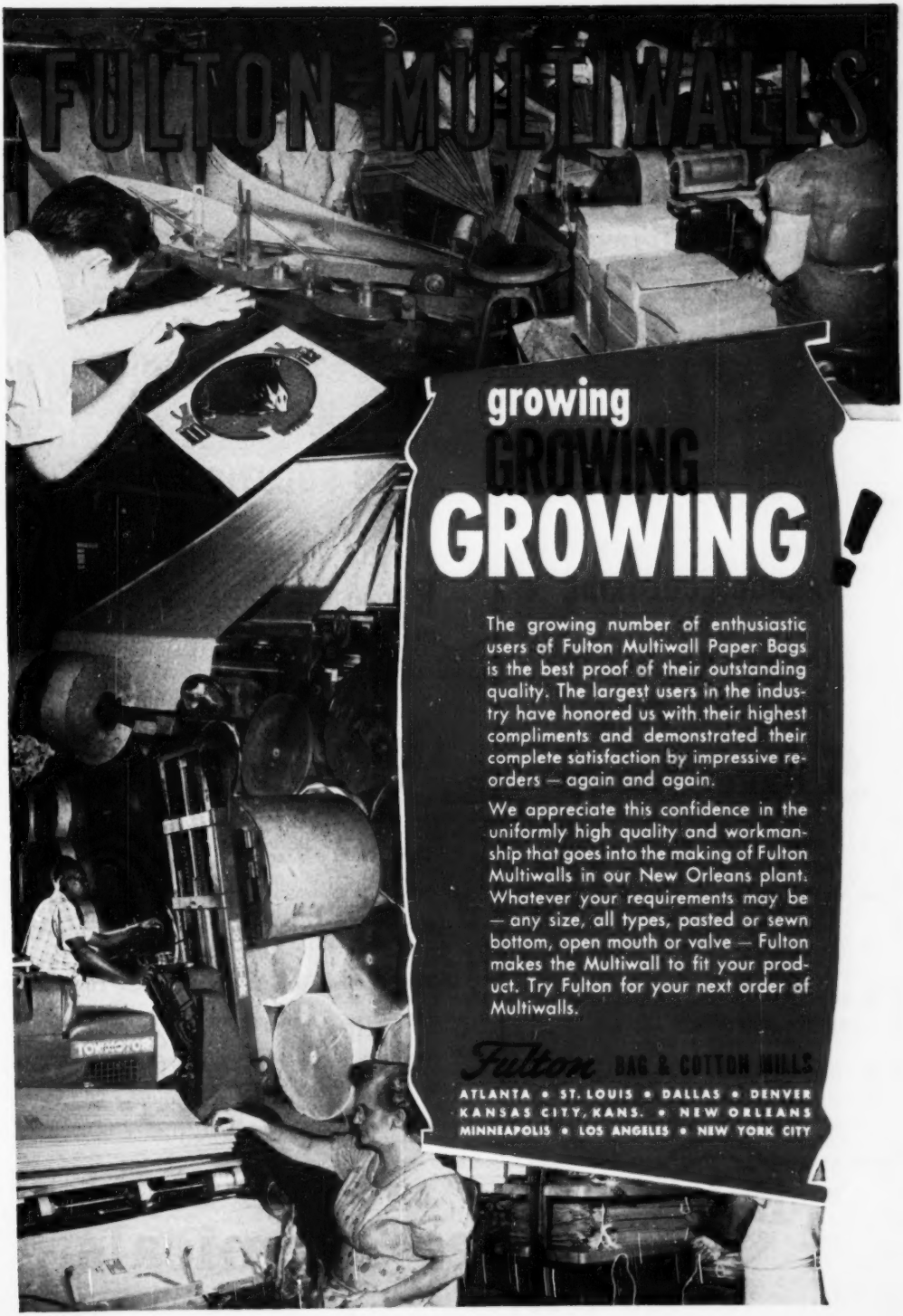
The new Navy analog computer, based on this realization, is a series of interlocking Wheatstone bridges representing the partial pressures of the various reaction products by their resistance values. With the new computer it is possible to rapidly obtain the compositions of the product gases. The figures are within ± 0.005 of a mole fraction of those computed by more precise but more involved methods employing calculating machines.

Radiation Meter



The weight of radiation meters has been brought to a new low of nine ounces in the new Detect-r-meter of Victoreen Instrument Co. It is a counting rate meter with a range up to 25 roentgens of radiation per hour.

Flow meter: The new V/A (variable-area) kinetic manometer of Fischer & Porter Co. is a differential-pressure, remote-reading instrument. Fluid flow is linearly converted into proportional air pressure by a magnetic follower. It is a through-flow, self-purging instrument which cannot be used at high viscosities (over 10 cps.) or for slurries. The working pressure is 1000 psi in Series 60 and 2500 psi in Series 150.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STANNIC CHLORIDE

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- ★ Made from pure metallic tin.
- ★ Crystals are large in size and colorless.
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- ★ Iron and lead content are reduced to the second or third decimal.
- ★ Saturated solutions are sparkling clear and free from basic compounds.

Today you can have both Stannous Chloride and Stannic Chloride of remarkable purity, made from refined metallic tin.

Not only are Baker Tin Crystals free from iron and lead to the second and third decimal, but you also have a closely controlled tin-chlorine ratio.

The crystals are large and free from surface discoloration. The assay value ($SnCl_2 2H_2O$) is maintained between 98 and 100%.

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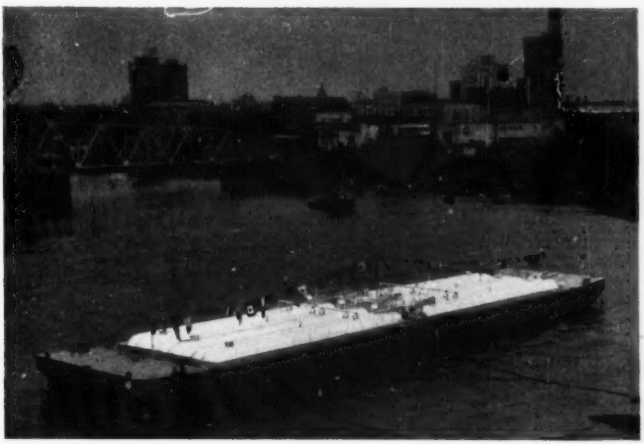
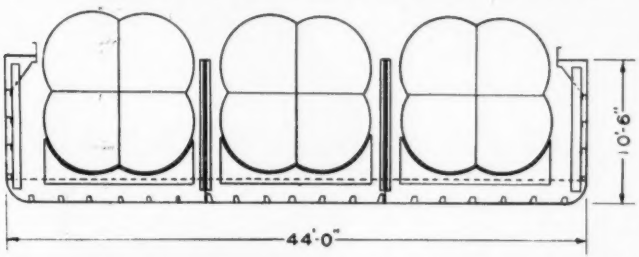


NEW PROPANE BARGE (above) makes use of unusual tank construction (below).



Propane by Water

"City of Mobile," the world's first barge designed to handle propane, was launched recently at the Bethlehem Steel shipyards at Beaumont, Texas. Its owners, Warren Petroleum Company of Tulsa, Oklahoma, will use the barge between its pipeline terminals at Houston, Texas, and its distributing center at Mobile, Alabama, over the Intercoastal Canal.

The new propane liner is big. It is 195 feet long and 45 feet wide and has a depth of 10½ feet. Its cargo hold consists of six multi-cylindrical tanks, composed of a number of cylindrical sections pressed together to withstand the pressure under which the propane must be stored. This multi-cylindrical tank feature, claimed to be a "first" in this type of barge, enables the vessel to carry 360,000 gallons of the important hydrocarbon.

Fumes Fade

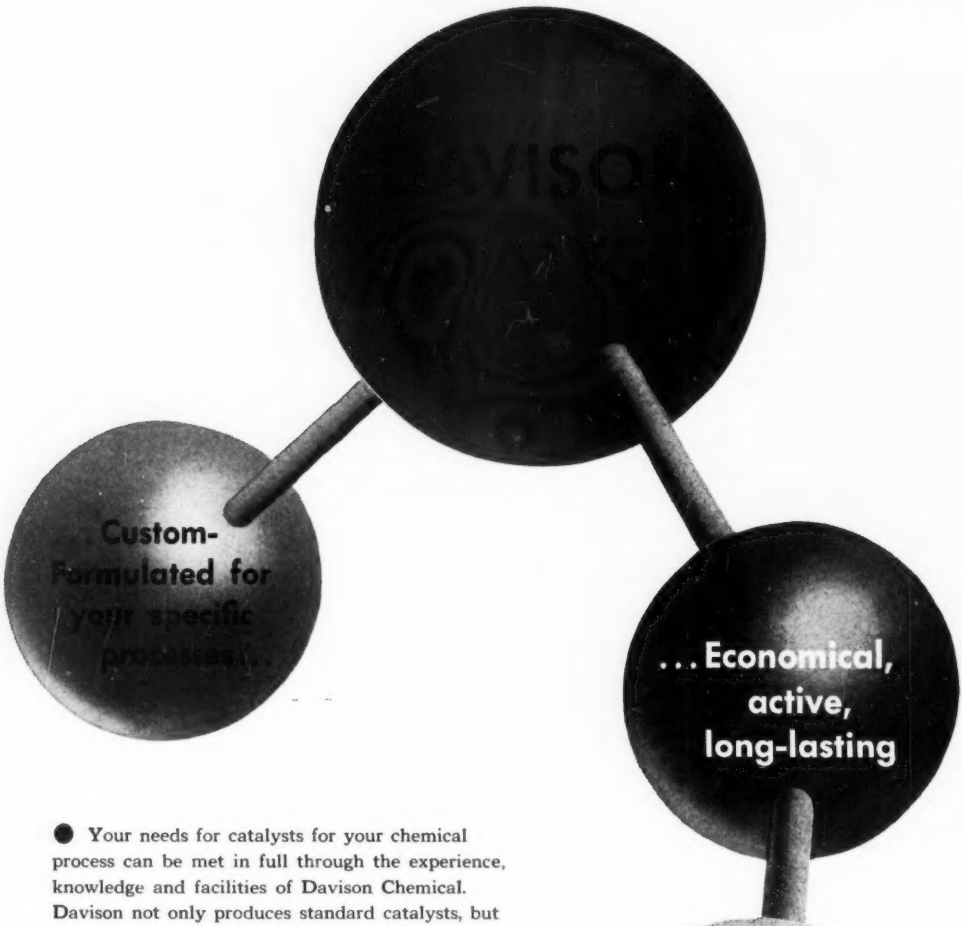
Industries faced with fume problems will be pleased to learn that Eugene Houdry, petroleum scientist in Philadelphia, has a solution for their trouble. Houdry has invented a device for turning carbon monoxide fumes into carbon dioxide. The device has been perfected—and is on the market—for use on vehicles propelled by unleaded gasoline. A version for leaded gasoline is still being tested.

The invention is being manufactured and sold by the Oxy-Catalyst Manufacturing Company, owned by Houdry and his family. One fork truck manufacturer has the new exhaust on its list of optional equipment at prices ranging from $120 to $220.

Houdry calls the invention the "catalytic exhaust." Catalyst, reportedly, is principally platinum. Houdry claims that the exhaust is easily attached and not only detoxifies the gases but deodorizes.

Reports on the invention have been highly gratifying to Houdry. At last count an even dozen concerns had tried out the new exhaust and all were well satisfied.

The idea presents possibilities for anyone using fork trucks in a closed building. It would make the ventilating problem easier and cheaper, and would be an important safety item.



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As a brominating agent, National Aniline N-Bromosuccinimide opens new frontiers in the production of synthetic organic compounds. Many useful and interesting reactions have already been discovered.

Write for a copy of new technical bulletin **"N-Bromosuccinimide as a Brominating Agent" which also contains an abstract of the literature on this product.**

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National N-Chlorosuccinimide is used in water purification and as a bactericide in neutral and acid dairy cleaners. "Starting formulas" for products in these fields are available on request.

N-Chlorosuccinimide also functions as a chlorinating agent for the side chain of aromatic hydrocarbons and as an oxidizing agent for partly oxygenated aromatics.

Samples and prices available on request. Allowance will be made on Succinimide recovered from halogenations made with National N-Bromo or N-Chloro Succinimides.

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Precipitated Itch

A new poison ivy remedy, TAM, that acts by precipitating the irritant in the plant, is being tested by Titanium Alloy.

Based on zirconium carbonate, it is also effective against some industrial dermatoses, and has promise as a personal deodorant.

Logical marketing set-up for the product will be on a royalty basis, so companies with savvy in selling to drug outlets are getting their bids in early.

Use of zirconium carbonate in such applications suggested itself during the war when it was noticed that some workers in the Niagara Falls plant of Titanium Alloy Mfg. Co.* smelled shower-bath fresh at shift's end while others had the expected fragrance of men just finishing a long day at hot, hard labor. The reason was simple: The more fortunate employees owed their social acceptability to working with zirconium carbonate which acted as an anti-perspirant. Consequently, this material with the unique effect was one of those that came to the attention of Dr. Eugene Wainer, formerly research director of Titanium Alloy.

Identifying the culprit: Wainer, an extremely curious man, had become interested in poison ivy. From his work, he concluded that a logical first step in finding a cure for poison ivy irritation was to determine the formula for the irritant in the poison ivy plant. He went to work on the problem, and in 1945 identified the villain as urushiol.

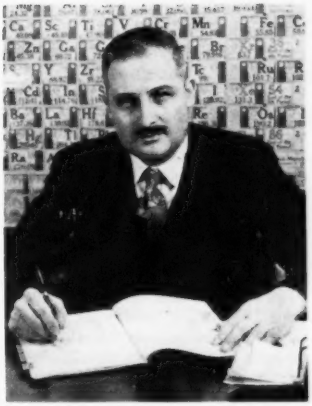
Reasoning that a zirconium compound should neutralize this material, he tried one and found that it precipitated the poison ivy plant extract quantitatively. Now hot on the trail, he infected himself with poison ivy and prepared a zirconium salve to see what it would do. His faith was justified, for the ointment cured all irritation rapidly.

There followed exhaustive biological studies at the student health agency of Syracuse University. Other experts were also enlisted in the work, among them Dr. B. Shelmire, Dallas, who is regarded as a national authority on the subject and a complete skeptic about ivy "cures". Zirconium carbonate was the compound finally selected because it is quite inert to the skin but highly reactive with urushiol. The present TAM Poison Ivy Ointment, which has received the Food and Drug Administration O.K. on toxicity, contains 25% of the salt, and is being put up in tubes and small jars.

From the data gathered so far, the ointment works for about 90% of those suffering from poison ivy, with improvement having a definite relationship with elapse of time between contact and treatment. Some members of the medical profession, which has held that the irritant in poison ivy reacts immediately upon contact with skin protein, do not think that an ointment can be effective if applied more than a short time after contact. It seems possible, however, that TAM's efficiency may lie in neutralizing excess irritant oil on the skin.

Other approaches: There are as many treatments on the market and in the home as there are medical opinions on poison ivy irritation. There is a good deal of evidence that the effect of the irritating element in poison ivy is an allergic reaction rather than a poison as the name implies. This has led to the use of antihistamines, both orally and topically, although topical treatment seems to be more efficient. Poison ivy concentrates are also administered either orally or by injection. Other topical treatments are based on oxidizing agents like permanganate and sodium perborate; solutions of calamine with phenol, and tannic acid in alcohol; and anesthetic or anesthetic-antihistamine creams. Typical of the many drug items in use are Parke, Davis & Co.'s Caladryl (calamine and benadryl hydrochloride) and Ivy Corp.'s Ivy-Dry (tannic acid and isopropyl alcohol).

Just when TAM will start to compete with these other types of products and on what basis has not been decided yet. The development program, now under the wing of Titanium Alloy's chief of chemical research,



WARREN BLUMENTHAL: Widening fields for TAM.

Warren B. Blumenthal, has unveiled further uses for zirconium carbonate. Not only does TAM look promising for poison oak, and athlete's foot, but it is being used on a limited scale to combat industrial dermatitis. The cashew nut oil extraction industry, long troubled with workers' skin complaints, is finding it helpful, as are producers and consumers of phenol and plastics fabricators. And the lush anti-perspirant market is still in the offing.

Small quantities of TAM are being sold to industrial plants, and a few alert drug store owners who have heard about the product, have been able to get some samples from the few gross Titanium Alloy has made up. It is now being sold for $1.00 for a 1-oz tube, but that is a tentative price.

When Titanium Alloy, which has the patent (U.S. 2,507,128) on the ointment, decides to give the go-ahead signal on retailing it, some other company will likely handle that phase on a royalty basis. At least one major soap company and a major pharmaceutical house are interested and eager.

Marked Cleaner

Textile finishing companies and testing laboratories will be the chief market for a radioactive isotope-containing synthetic detergent developed by Atlantic Chemical Co., Centredale, R.I.

The aim in building radioactive materials into synthetic detergents is to provide an "identifier" to follow the

* Now Titanium Alloy Mfg. Div. of National Lead Co.

detergent through the various stages of a wash cycle easily by means of a Geiger counter. Atlantic's experiments have shown that the idea can be used advantageously for textile scouring and washing purposes (determining washing procedures, etc.) and hopes to get into commercial production soon.

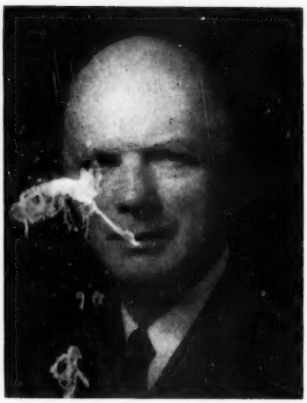
Of particular interest is the saving in skilled personnel's time made possible by the new product. Although a pH meter can be used to check alkaline detergents, complicated analyses, some requiring as much as two days' time, have been necessary to determine the presence of neutral detergents. With a neutral detergent tagged with a radioactive atom, the strength of a bath or the thoroughness of the rinsing of a piece of goods, can be instantly checked by a Geiger counter reading.

Atlantic found that radioactive materials could be mixed in most detergent powders or pastes, but this method was not suitable for textile use. In such scouring operations, there was the constant possibility of detergent's being rinsed out, leaving the radioactive material in the goods, or vice versa. Consequently, making the radioactive isotope part of the detergent structure was explored. The company, which is continuing work on application of radioactivity to all types of textile processing, is patenting various aspects of its inventions.

Cautious Debuts

Several new aerosol products are ready for marketing milestones, but their manufacturers are hesitating to brave pending shortages of metal containers, propellent gases and valves. Two are home-deodorants: Odor-Blitz of Industrial Management Corp. and "airwick mist", push-button companions of the famous Air-wick. The other, also an Industrial Management product, is the first drug-based aerosol.

Air-wick mist contains the same chlorophyll, etc., formulation that Airkem Inc. manufactures for Seeman Bros., owner of the trade name Air-wick and its distributor in the retail field. While Airkem (with distributional rights in the industrial field) has been selling Airkem Mist, a 12-oz, $1.70 low-pressure aerosol to such industrial outlets as doctors' and dentists' offices, institutions, hotels and theaters (*CI Newsletter, Aug. 1949*), it was not until four months ago that air-wick mist popped up on a few New York area store shelves.



W. H. WHEELER: More pressure on Air-wick.

Seeman apparently has found the initial marketing of this 5½-oz container retailing at 98¢ satisfactory, for it has been building up a stock to extend present marketing areas.

The producer does not see this companion product for Air-wick—pride of chlorophyll-advocate William H. Wheeler, Airkem president—as affecting Air-wick at all. It is confident that the established product will continue to garner most of the household odor control business. The wick-type is expected to be bought for the slow, steady control needed for most odors in the home, with the aerosol of value where there is an immediate control problem.

Sweet smell: Those already in the aerosol air freshening business see this partial defection from the wick as a mixed blessing. While it probably means that the convenience of the pressure can has cut into the lush home-deodorant market (in the $5-million range), it also means that an aggressive competitor with an effective grocery store distributional set-up will be in their pitching on two fronts. And then there are the newcomers in the field to join in the fight for sales.

The latest is an old-timer in the aerosol business: Tetco Co., a division of Industrial Management Corp., Los Angeles, which hopes to market Odor-Blitz soon. The company, which already has successfully "blitzed" the nation with its Moth-o-Blitz, Roach-o-Blitz and Insect-o-Blitz, isn't saying what the new product contains. A good guess would be some adaptation of a chlorophyll-based formula.

Both Tetco and the Air-wick producers fear that wartime shortages could blitz the new aerosol deodorants (as well as those on the market already). Military needs for insecticidal aerosols (*cf. "Prop for Allethrin," p. 11, this issue*) will get priority over air fresheners, so adequate quantities of propellents, containers and valve materials may not be available for launching these products on a national scale. Airkem does not have its own filling line for air-wick mist; has had Regal Chemical (Brooklyn, N.Y.) and Fluid Chemical (Newark, N.J.) filling for it. Conditions don't permit it to make a firm decision on the product's marketing at this time.

Although Tetco has a filling plant at Hobart, Ind., it is equally uncertain of Odor-Blitz' future. However, its Aerosol Cold-Releef, a room spray of ephedrine, menthol, peppermint, eucalyptus and chlorobutanol which has been marketed in the East, is due for a West Coast merchandising boost this week when a three-month, $5,000 newspaper advertising campaign rolls. This product—the first drug-based aerosol—doesn't come under Food and Drug Administration supervision.

Company officials deny that the W. B. Geissinger Co. found the price of its 12-oz size too high at $2.50 in a test-marketing, but it has just brought out a 6-oz can to sell for $1.50. Distribution of this size is more heavily confined to the East just now; as the Hobart plant ups production, it is appearing in the West Coast market.

Lens Cleaner

A formidable competitor for Dow Corning (Sight-Savers) has just entered the silicone-treated eye glasses tissue field. This is the Silicone Paper Co. of America, a New York company organized to exploit a new silicone-impregnated paper jointly developed by Package Advertising Co., a 25-year veteran of the paper field, and silicone producer General Electric. It is marketing the new product to industrial consumers under the trade name Magic Lens Tissue; is also supplying Kimberley-Clark with the same tissue for retail sale under that company's Kleenex label.

Silicone Paper is working on the sound assumption that you can get a worker to clean his goggles or glasses if you make it easy for him. It has a simple and inexpensive ($2.50) dispenser that can be mounted in plant, laboratory or office, and into which refills fit in the manner of hand towels. Advantages claimed over competitive products: larger tissues (5″x6-¾″) at

lower cost ($1.40 for packet of 800 interfolded sheets); and a less expensive, more easily filled dispenser. Safety supply jobbers are now being appointed. Sales slogan is, "It's General Electric Silicone–from the G. E. House of Magic–that does it."

The Kleenex glasses cleaners are being packaged in miniature Kleenex tissue "pop-up" boxes that fit into the pocket. Each box contains 28 sheets smaller than the Magic Lens Tissues, but larger than those in Dow Corning's match folder packages. National distribution is now being pushed.

Antibiotic Rinse

Sharp & Dohme, Inc., is placing on the national market a new spicy-flavored antibiotic mouth wash, Tyrolaris, believed to be the first such antibiotic product offered to the public. A feature of the new mouth wash is its cleansing-rinsing action. This is imparted by a surface-active agent which promotes spreading and foaming of the solution throughout the oral cavity.

Tyrolaris contains 0.02% tyrothricin, rapidly bacteriostatic *in vitro* against many gram-positive organisms in the throat and mouth; 0.02% d-panthenol which serves to reduce the number of lactobacilli which are believed to be partly responsible for dental caries, and a surface-active agent in a 10% alcohol base.

The new mouth wash will be marketed in 8-oz. bottles. Sharp & Dohme will not advertise the new product, however, treating it strictly as an ethical product. Samples will go out to physicians and pharmacists.

Du Pont Farm

The growing interest of the chemical industry in animal medicine and nutrition is underscored by the Du Pont Co.'s plans to spend about $2.7 million in expanding its research facilities in that field. It is readying the site for four modern buildings to go under construction early this spring at Oakland, a 291-acre farm near Newark, Del., that the company bought in 1948 for this purpose. The new facilities will be called The Stine Laboratory,* are expected to be completed within a year.

Du Pont's interest in research in animal medicine and nutrition dates back to 1945 when the Grasselli

* Named for Charles M. A. Stine, Du Pont director and retired vice-president who sparked the company's research in the agricultural and veterinary fields.

Chemicals Dept. entered the field. Work was carried on initially at the University of Delaware, and has continued there and in a large farm house at Oakland. When the new buildings are completed, they will house all Grasselli's work in this field.

Research at The Stine Laboratory will be directed toward application of new synthetic chemicals in controlling bacterial and virus diseases, as well as parasites and insects affecting the health of domestic animals. Animal nutrition will receive equal attention.

Local Operation

Northwoods Manufacturing Chemists, Inc., has just been formed at Porterfield, Wis., by a group of business and professional men from that area to take over the chemical specialties business previously operated by J. A. Chause at Menominee, Mich., under the same name. The new organization has purchased a large building in Porterfield, and production is already under way.

The line of products will include special chemicals for industrial use, synthetic detergents, solvents, disinfectants, floor finishes and wood cleaners. Additional items will be added at a later date. Basic raw materials will be purchased for manufacture into these proprietary products. The company will engage in private packaging as well as sell under its Northwoods label.

Marketing area will cover all of Wisconsin; upper Michigan, west to and including the Mississippi River cities; northern Illinois, and a portion of lower Michigan.

Continental Chemical Co., one of the largest makers of cleaning compounds on the Pacific Coast, has bought the plant site and buildings of Del Pasco Canning Co. in North Sacramento, Cal., to find room for its expanding operations formerly located in Sacramento.

Cattle ointment: An ointment-based combination of penicillin and dihydrostreptomycin for treatment of mastitis in dairy cattle is the newest veterinary product out of Cutter Laboratories, Berkeley, Cal. The medicine, Petrocillin S, is now being distributed only in the northern California area, but is expected to go on sale nationally by the end of February. Mastitis, an inflammation of the udder, causes a serious drop in milk production.

this is ISCO...

The photograph which makes up the background for this page is an aerial shot of the Isco Chemical Division plant at Niagara Falls, N. Y. Here, Innis, Speiden & Co. manufactures for industry such basic products as Carbonate of Potash, Caustic Potash, Ferric Chloride, Liquid Chlorine, Calcium Hypochlorite Solution and Chlorpicrin.

It is in this plant also, that the company's Insecticide Division produces Larvacide*, the versatile tear gas fumigant that sterilizes greenhouse soil, kills rats and mice and eliminates insect pests in granaries, warehouses, etc. Innis, Speiden's Iscomist* Aerosol Bombs for insect control in greenhouse, industry and agriculture are also formulated and filled in the Niagara Falls plant.

Innis, Speiden's Gums and Waxes are refined and processed in our Jersey City, N. J., plant. If our experience with chemicals, gums, waxes and insecticides can help you, please let us know. We've been known for service since 1816.

** Trade Marks of Innis, Speiden & Co.*

INNIS, SPEIDEN & CO.

117 Liberty Street, New York 6, N. Y.

Boston • Cincinnati • Gloversville • Chicago • Cleveland
Philadelphia • San Francisco • Los Angeles
Subsidiary: E. S. Browning Co., Inc. •
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ISCO™

Victor ammonium phosphates are used extensively by industry. Why not investigate the important properties of these chemicals which offer a wide variety of applications? You may effect a saving in your process or provide new advantages for your product.

Look over some of the regular uses listed below, and see which application or properties are interesting to you. We shall be glad to send you more information and samples at your request.

AMMONIUM PHOSPHATES
a group of VERSATILE VICTOR CHEMICALS

VICTOR MONOAMMONIUM PHOSPHATE

$NH_4H_2PO_4$

A brilliant white crystalline or powdered material.
All grades meet U. S. Pure Food Law requirements.
Grades: Crystalline, powdered, and powdered F. F. (free-flowing)
Typical Analysis:

NH_3 (min.)	14.5%
P_2O_5	61.0%
pH (1% solution)	4.5

VICTOR DIAMMONIUM PHOSPHATE

$(NH_4)_2HPO_4$

A brilliant white crystalline material, mildly alkaline in reaction.
Meets all U. S. Pure Food Law requirements.
Grades: Crystalline, powdered F. F., and dentifrice.
Typical Analysis:

NH_3	25.3%
P_2O_5	53.5%
pH (1% solution)	8.0

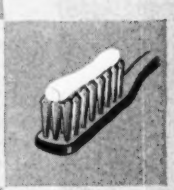
USES OF VICTOR AMMONIUM PHOSPHATES

Flameproofing paper, wood, textiles, and vegetable fibers.

Chrome dyeing of wool.

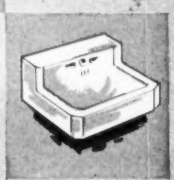
Acid cleaners and rust-proofing metals.

Ammoniated dentifrices.



Manufacture of yeast, vinegar, yeast foods, bread improvers, alcohol.

Ingredient of glass and vitreous enamel.



Preventing afterglow in matches.
Plant nutrient solutions.
Catalyst for urea formaldehyde and melamine resins

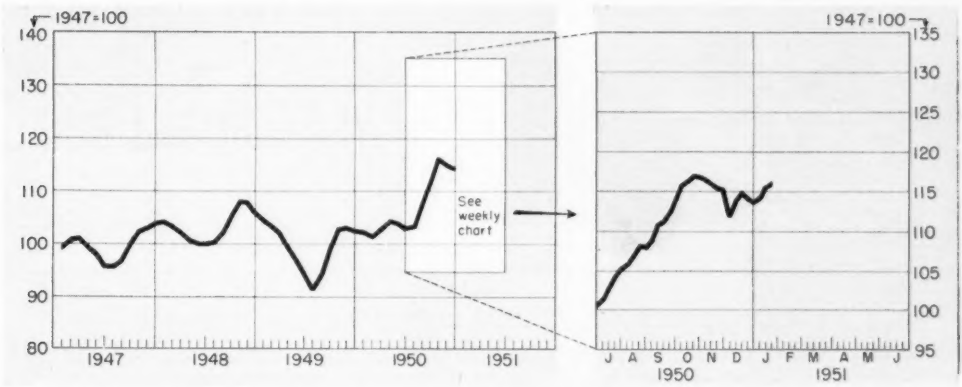
Write for Quotations, Technical Data, or Experimental Samples.

VICTOR CHEMICAL WORKS

141 WEST JACKSON BOULEVARD • CHICAGO 4, ILLINOIS

A. R. Maas Chemical Co., Division
4570 Ardine Street, South Gate, California

CHEMICAL MARKETS...



CHEMICAL INDUSTRIES OUTPUT INDEX—Basis: Total Man-Hours Worked in Selected Chemical Industries

This week found price and wage controls getting ready to envelop the U.S. economy. All indications from Washington point to implementation of the program at the earliest opportunity, in a few weeks or possibly, days.

Most chemical manufacturers in the U.S. are not unduly disturbed by the rising trend for all imports. Chemical and allied products for export have been running triple the value of corresponding imports in the last quarter.

Here are some million dollar figures from the Department of Commerce:

	Exports	Imports
October, 1950	$61.6	$20.0
November, 1950	70.3	22.8

Lately, mercury prices have been as hard to hold as the metal itself. The most recent surge of $40 is the third important advance in two weeks, bringing the level to $200 a flask, near the peak of World War II.

Marginal producers in California are anticipating a twentieth century bonanza, as they reopen idle mines.

Production of paints and paint materials flows in a record stream through assorted bottlenecks. Metal allocations by NPA have resulted in a drastic shortage of pigments based on titanium, cadmium and chromium.

Almost all drying oils are scarce, especially imports from the Far East, and prices are 100-200% over last year.

Driers based on naphthenic acids are definitely short, but tallates are relatively plentiful.

One conclusion seems likely: Spot shortages and some spotty quality.

Suddenly, hydrochloric acid is in the chemical spotlight. A useful but unspectacular performer, this product is critically short even with a 30% production increase in the past year.

Some important reasons include expanding uses for synthetic rubber, plastics, zinc chloride, and in oil well drilling.

Close cooperation between the rubber industry and the government has brightened the rubber situation. With U.S. synthetic production steadily increasing, the output for 1951 is expected to equal 800,000 long tons.

In the meantime, conservation of new rubber supplies and increased imports of the natural commodity mean one less major mobilization problem.

MARKET LETTER

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Industries Output Index (1947 Index=100)	116.9	116.4	103.2
Bituminous Coal Production (Daily Avg. 1,000 Tons)	1977.	2005.	1257.
Steel Ingot Operations (% of Capacity)	100.9	99.6	89.5
Wholesale Prices—Chemicals and Allied Products (1926 Index=100)	144.9	142.3	116.0
Stock Price Index of 14 Chemical Companies (Standard & Poor's)	215.7	209.7	158.5
Chem. Process Industries Const. Awards (Eng. News-Rec.)	$19,542,000	$5,412,000	$1,057,000

MONTHLY INDICATORS—PRODUCTION (Index 1935-1939=100)	Latest	Preceding	Year Ago
All Manufactures and Mining	216	215	179
Durable Manufactures	258	260	203
Non-Durable Manufactures	194	196	176
All Chemical Products	280	279	245
Industrial Chemicals	497	493	422
By-Product Coke	179	178	161

"Now you see it, now you don't" could refer to carnauba wax. Since December first, this product from Brazil advanced from 85¢ to $1.45 a pound with little in evidence even at higher prices. Brazilian interests indicate a poor crop, but some industrial users in this country seem notably unconvinced.

Substantial increase in benzene production from petroleum is in sight. Refiners, meeting with PAD, are discussing a proposed increase from the present 12 to 100 million gallons annually by hydroforming. Favorable government action in quick plant write-off is expected to insure adequate supplies of this critically short commodity.

Application of the nation's railroads for a 6% freight rate increase is under consideration by the ICC. Granting this request is problematical for at least two reasons:

First, the adverse effect on prices of almost every product.

Second, previous increases have not prevented the railroads from losing ground compared to motor and water transport.

Some claim that history repeats itself, but in the chemical industry, repetitions are rare indeed. As recently as World War II, the scarcity of nitric acid necessitated replacement by phosphoric acid. Today, a shortage exists in phosphoric acid fertilizer, and supplies are supplemented by relatively abundant nitric acid.

Most dislocations to the industrial economy could be minimized with suitable planning and judgment by government agencies. For example, capacity operation of synthetic rubber plants would require almost 2/3 of the total styrene production of nearly 53 million pounds. If this production is brought in more rapidly than needed, many plastics fabricators will face drastic cutbacks.

It will cost more to come clean this year. Rising costs on fats and oils are responsible for the recent 6% increase in soap prices by several major companies. The changes became effective following prior notice to ESA.

SELECTED CHEMICAL MARKET PRICE CHANGES . . . Week Ending Jan. 22, 1951

UP

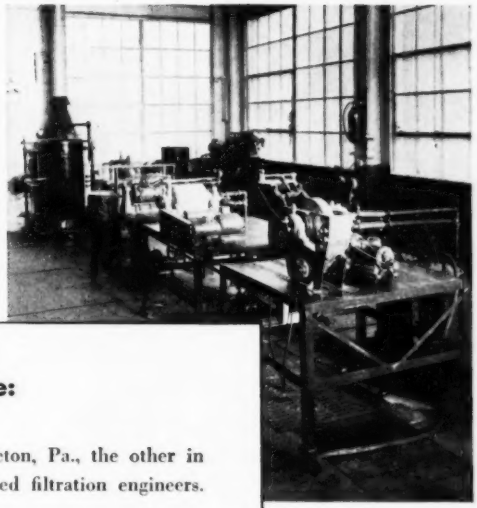
	Change	New Price		Change	New Price
Anise	+$.10	2.60	Lemongrass, cns.	+ .20	4.45
Calomel	.50	4.02	Mace Oil	.50	6.00
Camphor, tech.	.05	55½	Mercury Oxide, yel.	.83	4.15
Casein, dom., stand.	½¢	43½	Naphthalene, 78° imp.	.01	.07
Citronella, Ceylon	+ .10	2.50	Nutmeg, E. Indian	.50	5.75
Clove Oil, USP	.15	3.25	Rosin, gum, K, Sav. cwt.	.55	9.30
Eucalyptus (80-90%)	.10	1.55	Turpentine, gum./gal. Sav.	.01	.92
Gum Arabic, white	.05	.30	Stearic, single press. cwt.	1.25	25.75
Lecithin, edible, bleached, f.c.f.	.01	.21	Zein, bgs. (over 36,000 lbs.)	.03	.35
Linseed Oil, dms. c.l.	½¢	.217	Zinc Stearate	.02	.57

DOWN

Carnauba Wax, No. 1 yel.	.01	1.44	Tallow, fancy, c.l.	½¢	.17½

Prices per lb. unless quantity is stated

FILTRATION TESTS
in YOUR PLANT
or
OUR LABORATORY



Part of our well equipped test laboratory at Hazleton, Pa. Similar facilities are available at Oakland, California.

Oliver United offers you this service:

a–Two fully equipped laboratories, one in Hazleton, Pa., the other in Oakland, California, each staffed by experienced filtration engineers.

b–All types of test filters of both continuous vacuum and batch pressure types; also pilot plant filters to make tests *in your plant* under actual operating conditions. These filters are on a loan or rental basis and the services of a competent engineer are furnished.

The fact we have test filters in both vacuum and pressure classes is particularly important to those seeking the *best* filter type. Testing is not restricted to one type filter. And the fact that we have numerous types of *production* filters in both classes is even more important. You, in search of an answer to your filtration problem, are assured of a thorough testing of the product to be filtered to guide in selecting the best production unit to handle the tonnage called for by the flowsheet.

While we have handled many products for 44 years, new products coming along require thorough testing to establish their filtering characteristics. We believe we have the best facilities for this purpose and will be glad to work out any filtering procedure with your engineers.

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Dorr-Oliver S.N.a.R.L. Paris
Dorr g.m.b.h. Wiesbaden (16)
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PHILIPPINE ISLANDS
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HAWAIIAN ISLANDS
Honolulu
A. R. Duvall

WEST INDIES
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SOUTH AMERICA & ASIA
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Johannesburg, Transvaal

Wyandotte Dichlorides ...solvents worth looking into

If you use solvents, extractants or chemical intermediates, you'll find Wyandotte's Ethylene and Propylene Dichlorides worth investigating.

Ethylene Dichloride, for instance, is already in wide use as an ingredient in fumigants, insecticides, textile scouring bath compounds, resin solvents, rubber cement, cleansing agents, mastics, and as an extractant for essential aromatic oils.

We'll be glad to send you samples and data, on request.

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CARBOSE (Sodium CMC) • ETHYLENE DICHLORIDE • PROPYLENE
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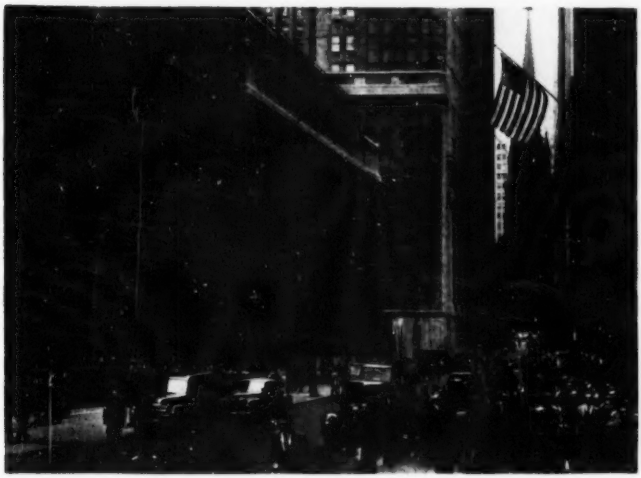

WALL STREET: Helps a growing industry to grow even more.

Oasis for "Outside" Money

Rapid expansion of chemical industry makes Wall Street method of financing a "must".

Dow, Monsanto, American Cyanamid and others use stock and bond method to handle high construction costs.

Smaller companies have tougher problem . . . . must rely on RFC and bank term loans.

Dow Chemical's recent offering of 200,000 shares of its common stock to employees and common stock holders at $57.50 per share is a sign of the financial times in the chemical industry. More and more chemical enterprise is using the Wall street method of financing expansion, the stock and bond route, rather than the "housewife" method of financing out of depreciation reserves and retained earnings.

Several things have been responsible for this trend. The rapid rate of expansion in the chemical industry since World War II, with plant capacity more than doubled in the past decade, has forced many leading companies to seek outside "heavy" capital instead of relying mainly upon internal resources. Then too, the stepped up pace of new product development in the industry has increased the rate of obsolescence (always relatively high) and intensified the pressure for a continuing high rate of capital outlays.

Though financing problems may be eased somewhat in the mobilization period ahead by emphasis on new plant facilities for products for military purposes, money raising will still require effort. Government aid can be expected in the form of accelerated amortization on such installations. But present high construction and new equipment costs, among other items, will make it difficult for many companies to rely entirely on depreciation reserves and retained earnings for expansion and plant improvements.

Dow itself, provides a good illustration. For from 1939 to 1950 (taking the end of the fiscal year, May 31) it spent some $319,419,000 on property additions. During the same period, net earnings totaled $152,704,000 and depreciation charges amounted to $126,853,000. Obviously, the combined total, $279,557,000, fell far short of the amount paid out in expansion.

Dow paid for part of its capital outlay in this period from internal resources. But about half of the expansion costs were financed through the sale of bonds, preferred stock and common stocks. And the senior obligations bore most of the load.

Though percentagewise, Dow's expansion in recent years has been more rapid than that of most of the larger companies, Dow has had no monopoly on the use of "outside" money.

Monsanto, for instance, increased its outstanding preferred stock from $10 million at the end of 1940 to $33 million at the end of 1949. It also sold $30 million worth of debentures in 1946. These two moves resulted in a net increase in senior obligations of the company of $53 million.

Significantly, during this same period, Monsanto spent $145,600,000 in property additions. This means that $92,600,000 came from internal sources.

American Cyanamid has experienced the trend to "outside" money too. In the period between the end of 1940 and the end of 1949 it expanded its funded debt from $11,648,000 to $57,561,000. Similarly, in this same interval it increased its outstanding preferred stock to $36,823,000 from $8,548,000. In addition the company spent $65,520,000 from internal resources for expansion.

Rising construction costs, in the last analysis, seem to be the big overall bugaboo in the financing problems of the chemical industry. Depreciation reserves set up to recover original costs are wholly inadequate to provide for even normal replacements. The cost of construction of today's chemical plant is about three times more than it was even during the high priced days of World War II.

The financial dilemma for management is heightened even more by the temptation of the favorable profit margins on new products in present markets and the economies that can result from the installation of improved facilities. Both new products and more efficient processing entail construction outlays in a period of costly construction . . . . there's the rub.

As a result, each management will have to examine its individual situation carefully and decide just how much it must dump into new facilities and improvements to keep the profit curve on the upswing. This is buttressed by the fact that 1950 earnings for the leading chemical and drug companies are expected to be shown to average about 50 per cent above the 1949 level. And the average in-

crease in sales has been about 25 percent.

Medium-sized and small chemical companies have even a more difficult financial row to hoe. Their costs in equity financing are relatively higher because of the greater risk element. And Reconstruction Finance Corporation loans and term loans from banks seem to be their best recourse. In some cases banks have made repeated renewals of notes thus establishing a certain type of term credit. But unfortunately this type of financing puts a company in an obviously vulnerable position from which it can topple in a tightening economy.

Commercial factors have been a great help in the financing problem of the medium-sized companies. Factoring in the past has been used mostly in the textile field, but chemical concerns in recent years have become active users of this service.

Factoring makes use of the old principle that a company's accounts receivable are valuable assets that can be used to increase a concern's operating captial. The factor advances payment on outstanding accounts receivable, up to 90% of face value and remits the remaining 10% when the accounts mature. This is usually not later than the 10th of the following month. The factor then assumes all the client's new accounts receivable and pays when the order is shipped.

By utilizing retained earnings and such varying financing devices, smaller chemical companies are providing for sharp expansion in production facilities . . . and at reasonable costs.

Experts point out one difficulty in the mounting debt structure that results from this type of financing . . . the stripping of a company's reserves. An example of this situation is that of the injection molders of the plastics industry. Most of these manufacturers are small firms who have expanded their productive facilities greatly within the years since the war to meet the civilian demand.

In the present situation with raw material shortages likely to curtail production and earnings of many firms they may be in a dangerous situation. A committee of the Society of the Plastics Industry estimates that one-third of these small firms face possible ruin in the period immediately ahead.

But regardless of what form of financing the chemical industry will use to meet its expnasion needs it must live with one big fact. The investment per worker in the chemical field is more than four times the figure for all industry.

CARD PROGRAMMED CALCULATOR: Several weeks' work in 8 hours.*

Electronic Brain

Human brainpower will not be wasted on lengthy calculations at Monsanto's home office in St. Louis. The company has enlisted the aid of IBM's Card Programmed Calculator —alias the electronic brain. Installation which will be completed early next month will signify first time the famed machine will be used for general accounting purposes. Monsanto will use the CPC to prepare consolidated balance sheets, income statements, and internal financial reports. The machine will also be available for technical computations.

Under Monsanto's present set-up, a half-dozen ledger books are prepared on IBM machines to take care of the general accounting. From these, reports are compiled by taking factors from the ledgers and taking factors from previous reports. The electronic brain will do all this mechanically.

How it works: CPC at Monsanto will use 200 factor cards and 1600 program cards. Factor cards contain specific information, e.g., total sales for month. Program cards are instruction cards—they tell the machine what to do.

Given two factor cards, CPC can perform any desired operation on them. For instance, it can find ratio of sales for current month to sales for year. The machine can store the information in its memory, transfer it to another card, or print it. And it can turn out series of such operations at a basic rate of 9000 an hour.

The electronic brain will be used by Monsanto to prepare consolidated balance sheets, income statements, and a dozen supporting statements.

Time saver: Monsanto estimates say that the electronic brain can do in eight hours, work that had previously taken one man several weeks. This means the man's time can be put to use gainfully on other less tedious calculations. And it makes possible calculations that were formerly impossible.

The machine, since it will be used for accounting purposes for a short period each month, can turn out plant ledgers and leave ample time for engineering and other scientific calculations.

Mass production. CPC is a combination of several IBM machines. The heart of the machine is the electronic computer—also frequently called the electronic brain. Other components give the computer additional storage capacity on memory. Mass production of components have made CPC available at the relatively low rental fee of $1500 a month.

Man or machine: Terminology used by IBM experts (like memory and think) when talking about the electronic brain have led some "overenthusiastic journalists" to attribute

*Dr. Hurd, IBM director of applied science; Dr. Thomas, Monsanto exec. v. p.; E. M. Douglas, IBM v. p.; D. M. Sheehan, Monsanto v. p. and comptroller.

human characteristics to the calculator. The people at IBM are quick to deflate that idea, however. "It's just a machine" they say. But it's a fantastic machine with a long line of illustrious ancestors that traces to the abacus.

Wheat and Money

Barter Deal: Industrial Fermentation Company in Denver added a new wrinkle to corporate financing. The company filed application with the SEC for sale of 2,832,000 shares of stock. The stock is being offered not for cash—but wheat. One bushel of wheat will buy one share of stock.

The company says it does not plan to use the wheat but will sell it for cash. Based on the price of wheat in the Denver area, complete sale would mean an addition to capital of over $5,000,000. The new capital will be used to purchase land and erect a new plant.

Armour: Recent annual report revealed a profit of $19,038,787. For the first time in history of the company, figures were broken down to show comparative earnings of food and non-food items. Chemicals, pharmaceuticals and other non-food items accounted for 58% of the total earnings.

Dow: Report released last week shows the company had a sharp increase in sales and a corresponding increase in net income, over same period for last year. For six months ending November, 1950, income was $20,143,810; for same period in 1949, income was $15,133,416. Net sales for period amounted to $154,181,840. That figure for last year was $101,646,810.

Pakistan Prefab

In a 14 million dollar project, Boston is the point of departure for two completely prefabricated chemical plants destined for Pakistan in the jungle foothills of the Himalayas. Initial shipment set sail from Boston recently and remainder will follow in a few months. Each plant—one for manufacturing caustic soda and the other a mill for producing paper from the abundant bamboo—will be the first of its kind for Pakistan.

A vanguard shipment carried prefabricated barges and tugs, and trucks, bulldozers, and cranes. The barges and tugs will be assembled at Chittagong in East Bengal and will carry the other equipment 85 miles north. The bulldozers will clear the land for the assembly of the plants when they arrive.

The deal was engineered from sale to shipment by young Bernard Meyers, head of foreign trade for James Russell Engineering Works in Dorchester, Mass. Meyers is that nice combination of salesman-engineer and both abilities were taxed before the enterprise was well under way.

Priority: One of his biggest difficulties was to convince government officials that he should get a priority for the necessary metals and alloys. He enlisted the aid of the State Department by pointing out that a wealthy Pakistan would be a poor breeding ground for communism and would stand as a bulwark of democracy in the middle of its communist-torn neighbors. Furthermore, he said that his barges could be used to transport military equipment up the jungle rivers.

The plants will provide employment for 10,000 people. The caustic will feed Pakistan's growing industries and the mill will supply high-grade stationery and cartons.

EXPANSION

American Cyanamid: New equipment at its Warners Plant in Linden, N. J., has started operating. Equipment will speed up unloading of sulfur from steamship to distant storage facilities. Capacity of equipment—which includes an unloading tower and a new type boom stacker—is estimated at 600 tons an hour.

A recent shipment of 10,600 tons of sulfur was unloaded in less than 4 days. With the old equipment, the job would have taken 9 days. Cyanamid claims that this time will be cut to 2½ days after minor mechanical adjustments have been made and operators get more practice on the new equipment.

CYANAMID: Longshoremen's delight

B. F. Goodrich: Reactivation of its Institute, West Va. plant has started. The plant will produce 90,000 long tons of synthetic rubber annually, equal to 1/12 of total consumption in U. S. First unit has been completed—approximately 70 days after work had begun. Production has started but plant won't hit full production until April.

The Goodrich-operated government plant at Port Neches, Texas, will install refrigeration equipment to expand capacity. New equipment is expected to up cold rubber production by 30,000 to 45,000 tons a year. Present capacity is 60,000 tons.

Olin Industries: New plant in North Carolina is expected to be completed and producing at capacity by September of this year. The plant will produce an estimated 33 million pounds of cellophane a year. Company produces cellophane under license from du Pont. Du Pont has designed and is building plant.

PEOPLE

Pfizer Antibiotics Division: Four men were promoted and a medical director appointed. Fred C. Sands, formerly assistant sales manager was named director of training for the division. His post as assistant sales manager will be taken over by Thomas G. Bradley, who had been acting eastern regional manager. George Guess will move into the position of eastern regional manager. He will be replaced as southeastern district manager by Robert Bittner. Dr. Alan Wright, formerly associate director of clinical research for Schering Corp., is the new director of medical service.

John C. Koch was appointed vice president in charge of sales for Cornoflow. Koch had been general sales manager in Philadelphia for the company.

G. J. Ticoulat is new vice president for Crown Zellerbach Corp. He has been with the company for 33 years—he started in the San Francisco office in a clerical position.

Robert L. Minckler, president of General Petroleum Corp., in Los Angeles, has become president of Western Oil and Gas Association.

Raymond W. Frederick, formerly with Carey Manufacturing Company, has been made supervisor of employee relations for G.E.'s Chemical Dept. at the Decatur, Ill. plant.

MANAGEMENT* BEAMS: Latest descendant of old chinese line.

Celanese News

This week employees of the Celanese Corporation of America are awaiting the second edition of Celanese News—a house organ that was started last month for them . . . and at their own suggestion. Employee approval of the first run, which was partly experimental, was so unanimous that Celanese management agreed that the new magazine should become a permanent fixture of their employee relations program.

Officials at Celanese had long been aware of the advantages of such a publication, but felt that the demand for one should come from the potential readers . . . the employees themselves.

Met demand: The grass roots movement started as a reaction to a divisional publication of the company, Celanese Plastics Newsletter, which has a large following. A group of its employee-readers approached a plant manager and asked "how about a magazine for the whole company?" At the next sales meeting the plant manager repeated the question and management answered with a strong affirmative.

The first issue of Celanese News emphasized the end use of Celanese products in an effort to inform the employee of the part his work plays in the overall picture of company operations. For Celanese, like many other chemical companies, is a manufacturer of intermediate materials and has the job of showing the employee how process materials fit into the final products.

China began: Historians have some interesting facts about where the whole idea of company publications started. Most agree that it can be traced back to the Hans dynasty which existed in China more than 2,000 years ago. Feudal lords at that time often published papers for circulation within their courts. These often became the official gazettes of the realm.

Still other historians give the credit to the ancient Egyptians. But most agree that the Lowell Offering, "written, edited and published by female operatives of the Lowell Cotton Mills" in 1840, was the first house magazine published in America. Merck & Co. was the forerunner for the chemical industry when it published the Merck Report in 1891.

House not house: Experts on the subject no longer like to use the term, house organ. They point out the "house" is no longer an apt description of a large industrial concern and the word organ too often bears the connotation, ". . . . an instrument of wind."

Editors of house publications, like editors everywhere, often are faced with the problem of impressing their publishers with the fact that people actually read their output. At a recent annual meeting of the House Magazine Institute one speaker told of an early editor who to impress his management deliberately printed a hoax story that all the company's salesmen would have their commissions cut. Response was enormous and the readership of the magazine was well proved. In the process the editor lost his job. But he had made life easier for his successors in the industrial fourth estate.

Unsung hero: His sacrifice was not in vain. The debut of Celanese News brings the estimated number of company magazines in the country to 5501 and increases their total circulation to well over 40 million. There is no longer any doubt that the production of editorial matter about employees for employees, their friends and families has become a major publishing enterprise.

* (L. to R.) A. S. Dempewolff, adv. manager; Emery N. Cleaves, vice president, public relations, E. R. Allan, vice president, labor relations.

Sherman Again

U. S. District Court in Wilmington was buzzing last week. The government started its suit against du Pont charging that company with violation of the Sherman Anti-Trust Act. The government contends that du Pont entered into a conspiracy with several foreign companies to create a monopoly on cellophane.

Du Pont denies the allegation emphatically. It points to the fact that it has faced growing competition in the field, and that there are a number of competitive products on the market which are indistinguishable from cellophane to the unpracticed eye.

One of du Pont's competitors is Sylvania Industries, a subsidiary of American Viscose. Olin industries, a big producer of cellophane, operates under du Pont license.

The foreign concerns named as "co-conspirators" are La Cellophane, in Paris; British Cellophane Ltd.; Canadian Industries, Ltd.; Kalle and Company, Germany; Societe de La Viscose Francaise; and Viscose Development Company, England.

The trial, which gives every promise of being a lengthy one, is scheduled to run three days a week until the end of February. A month's recess will follow and the trial will resume on a five-day-week basis.

War Chest

CIO Gas, Coke and Chemical Workers are busy taking steps to create a strike fund which will help "build a strong, aggressive union that can meet any employer in the chemical industry on the basis of equality of bargaining power."

The union's 56,000 members were voting in a referendum to amend the union's constitution and start a strike fund into which each member would pay 25 cents a month. Only a majority vote is necessary for the plan to be approved. And the ayes seem to have it.

President Martin Wagner and the executive board of the union are confident of an early approval. They have concentrated on getting an overwhelming affirmative vote. This, they believe will give management "clear proof" that the union means business.

Right now the union is concerned about some 100 members who have been on strike since last april at American Cyanamid's plant at Joliet, Ill. The issues there, according to the union are wages and the contract modifications demanded by the company. The local involved, local 119, is the home group of Cecil Martin the union's secretary-treasurer.

Financial assistance is given striking locals from time to time under the present constitution. But when the strike fund is established other rules will prevail.

Payment: Strikers will get $10 a week beginning with the third week of the strike. But there are three strings hung on this payment: The strikers must be in good standing with the local; the local must be in good standing with the international; and . . . strikers must picket and perform other strike duties as assigned.

Reserve fund of $75,000 must be built up before any regular benefits are paid, the plan states. But the executive board of the union may make an exception in special cases. It is estimated that it will take six months to build up this reserve by the contributions. The fund will take $14,000 a month from the members . . . a total of $168,000 a year.

Winthrop-Stearns: A complete return to work was reported last week, signifying the end of a week-long wildcat strike. Union (International Chemical Workers, Local 61, AFL) and management resumed talks on cost of living wage increase. In the strike 500 of the 950 workers walked out.

FOREIGN

Australia: "Down-under" employee pension plans had a boost recently. Out of 1,006,505 new shares of stock issued by Imperial Chemical Industries of Australia, and New Zealand Ltd., 37,130 were earmarked for the company's pension fund. Another 260,000 shares were offered for employee purchase.

In addition to the new capital issue, I.C.I.A.N.Z. has floated a 4% debenture in the amount of £3,000,000. The new funds, equivalent to about $9,000,000 will be used for expanding the company's plants at Osborne, South Australia; Botany, New South Wales; Yarraville, Deer Park and Ascot Vale, Victoria.

The Osborne plant produces soda ash, solid caustic soda, and bicarbonate of soda. Botany and Yarraville are making liquid chlorine, chlorine compounds, and liquid caustic. The Deer Park plant is an explosives and plastics plant.

Austria: Production of Kalkammonsalpeter—a mixture of ammonia nitrate and lime was up 35% over 1949, according to recently released figures of the Austrian Nitrate Works. The company is now able to meet all requirements of Austrian agriculture and remain one of the principal exporters in the country.

Total exports for the company in 1950 amounted to 298,000 tons—valued at $11,000,000—and accounted for 5% of total exports for Austria.

France: Production of pharmaceuticals is now sufficient to meet home requirements and leave a balance for export to the colonies. Soon France will be in a position to export to foreign countries within the limits of international agreements.

Penicillin is being turned out at a rate of 2000 billion units a month—500 of which can be exported. Cost price has been reduced 85%. Streptomycin is still being sold on prescription only but has been available in all pharmacies since mid 1950. Output—1300 kgs. per month—is more than enough to meet her requirements. Chloromycetin is also unrationed and available.

Switzerland: Swiss exports of pharmaceuticals hit a new high last week. It marked first time that the exports of pharmaceuticals exceeded aniline. Outlook is for favorable trend in pharmaceuticals to increase for some time, but long term prospects are not so bright. More countries are concentrating on the import of pharmaceutical raw materials only.

Exports of chemical pharmaceutical products for 11 months of 1950 were valued at over 200 million francs, 25 million francs over 1949.

BOOKS . . . . . .

Sourcebook on Atomic Energy, by Samuel Glasstone. D. Van Nostrand Co., Inc., New York, N. Y.; 546 pp.; $2.90.

This sourcebook presents a comprehensive review of basic non-secret atomic energy information prepared under the direction of the Technical Information Service of the U. S. Atomic Energy Commission. It describes the growth of thought and knowledge in the field, the development of the theories of the nature of electricity and energy, the discovery of the phenomenon of radioactivity, and the study of isotopes, all of which led to atomic piles, man-created new elements and the release of atomic energy.

Nuclear fission, the utilization of nuclear energy, the uses of isotopes, and cosmic rays are also covered by the author. This book will be of value to anyone interested in the scientific and technical aspects of atomic energy.

Coal, Coke, and Coal Chemicals, by Philip J. Wilson, Jr., and Joseph H. Wells. McGraw-Hill Book Co., New York, N. Y.; ix+509 pp., $8.00.

This text offers an up-to-date report on the present practice in the coking industry. Each phase of the industry is systematically covered. Since the primary products of the coking industry are fuels, the subjects of fuels and combustion are first reviewed. Coal is then discussed in regard to its origin, classification, properties, and preparation. A description of the coking processes themselves and the recovery of the coal chemicals follow. Additional chapters are devoted to carbonization processes other than those carried on in byproduct and beehive ovens, including gas retorts, low-temperature carbonization processes, and the Curran-Knowles oven. Economics and trends in the industry are considered in the two final chapters. Liberal use is made of illustrations and diagrams pertinent to the subject discussed, and a convenient bibliography of literature is included in the volume.

The Chemical Formulary (Vol. IX) edited by H. Bennett. The Chemical Publishing Co., Inc., Brooklyn, New York; xv+648 pp., $7.00.

This ninth volume, like those that preceded it, serves to answer the need for a practical compilation of commercial formulas for chemical compounding and treatment. To insure coverage of all fields, an editorial board is maintained, composed of chemists and engineers in multiple industries. In this volume of the reference series appear thousands of industrial formulas and methods of formulation in such diverse fields as adhesives, cosmetics and drugs, ceramics, glass and cement, colloids, food, insecticides, fungicides and weed killers, paper, photography, polishes, soaps and cleaners and textiles.

The formulas may be used as they are for preparing the basic products of a manufacturing firm, and they may also serve as a source of ideas and a starting point of experimentation for formulating different products. The alphabetical list of chemicals and their suppliers has been enlarged with new trade-mark chemicals.

The Identification of Molecular Spectra, by R. W. B. Pearse and A. G. Gaydon. John Wiley & Sons Inc., New York; vii+276 pp., $8.50.

This second edition contains wave length data for the use of scientists in facilitating the identification of molecular spectra in the wave length region from 10,000 A to 2,000 A. To this end the authors have provided photographs of the common band systems, tables of wave lengths, suggestions for using the tables, and general information about band spectra.

Briefly Listed

CATALOG detailing standard equipment used for automatic heat and automatic power installations issued by Preferred Utilities Manufacturing Corp., 1860 Broadway, New York, N. Y. Cost, $2.50.

A. S. T. M. STANDARD ON PLASTICS, fifth edition presents 120 specifications and test methods covering a wide range of plastics and related materials. Much new material has been added. American Society for Testing Materials, 1916 Race Street, Phila. 3, Penn. Priced at $4.85.

COLORIMETRY, booklet describing the standards and measurement methods developed by the Bureau of Standards. Available from the Sup't. of Documents, U. S. Government Printing Office, Wash. 25, D. C., at 30 cents a copy.

PRODUCTION AND MARKETING OF ASPHALT TILE, a study examining the economic aspects of the production and marketing of asphalt tile, plus an analysis of the feasibility of producing asphalt tile in the Pacific Northwest. Published by the State College of Washington, Bureau of Economic and Business Research, Pullman, Wash. Priced at 75 cents.

INSTRUMENTATION FLOW PLAN SYMBOLS, a system of symbols and identifications for industrial process instrumentation equipment to designate and identify such equipment on flow plans, etc. Instrument Society of America National Office, 921 Ridge Ave., Pittsburgh 12, Pa. $1 for individual copies; price reduced proportionally for larger orders.

BOOKLETS

Chemicals

Organic Chemicals

16-p. booklet entitled "Physical Properties of Synthetic Organic Chemicals" furnishing descriptive details and technical data on applications and physical properties of more than 250 synthetic organic chemicals in tabular form. Carbide and Carbon Chemicals Division, Union Carbide and Carbon Corp.

Permalite

8-p. general brochure on Permalite lightweight aggregates giving complete data on the advantages, uses, and applications of Permalite lightweight plaster and Permalite lightweight insulating concrete. Great Lakes Carbon Corp., Building Products Division.

Nioxime

Bulletin on uses, properties and price of 1,2-cyclohexanedione dioxime (Nioxime) is now available from the Jasonols Chemical Corp.

Hydrocarbons

12-p. catalog listing specifications and prices of research, pure, technical, and commercial grade hydrocarbons in addition to aliphatic sulfur chemicals. Phillips Petroleum Co.

Dispersions

Technical bulletin containing information on properties and methods of applying Kel-F (trifluorochloroethylene thermoplastic) dispersions. The M. W. Kellog Co.

Organic Chemicals

4-p. supplement to firm's organic chemicals list containing new chemicals, prices, and price changes now in effect. Eastman Kodak Co.

Finishes

20-p. brochure entitled "The Story of Duco Finishes" presenting picture story of the creation and development of modern finishes and their effects on industry and American living. E. I. du Pont de Nemours & Co.

EQUIPMENT

Process-Equipment

8-p. illustrated bulletin reviewing the firm's line of crushing machinery, milling equipment, laboratory machines, dry batch mixers, batch blends, air separators, and vibrating screens with reference to operational details, sizes and uses. Sturtevant Mill Co.

Photometer

8-p. booklet explaining theory of operation, principal components, and operating procedure of x-ray photometer designed for chemical analysis by x-ray absorption. General Electric.

Steel Tubing

20-p. pocket-size booklet presenting brief descriptions of terminology used in the manufacture and application of steel tubing. The Babcock & Wilcox Tube Co.

Transformers

4-p. illustrated bulletin emphasizing the safety and economy of the company's air cooled distribution transformers. Also included are details about the various types of power center and "packaged power" units and lighting transformers. Marcus Transformer Co., Inc.

Purifiers

8-p. manual specifically designed for the convenience of engineers who must select the proper purifier equipment to solve entrainment problems in vapor, steam, gas, and air applications. Complete with data tables, formulas and glossary of terms. Centrifix Corp.

Volumeter Chlorinizer

4-p. bulletin discusses the operation, special features, and installation of high capacity chlorinizer which is designed to meter chlorine gas accurately at rates from 100 to 6000 pounds per 24 hours. Builders-Providence, Inc.

Valves

18-p. bulletin covering the firm's line of "corrosion resistant" gate, globe and swing check valves for uses in refineries, chemical and pharmaceutical plants, food and beverage industries and other uses where corrosive media or corrosive atmospheric conditions are involved as a problem. Pacific Valves, Inc.

Filters

18-p. brochure giving descriptive details of the water filtration picture today and a brief summary of how it developed. Additional information is given concerning the advantages, special features, and industrial uses of the firm's line of filtration equipment. R. P. Adams Co., Inc.

Motors

4-p. bulletin describing C-W explosion-proof sealed power motors specially designed for hazardous locations, containing descriptions and illustrations of all component parts. Crocker-Wheeler Div., Elliot Co.

General

History of Chemistry

A detailed and comprehensive outline of the history of chemistry tracing the evolution of the science from its pre-Christian origins in India, China and Egypt up to the present time. The outline is in the form of a flow sheet consisting of two charts printed on a sheet almost a yard wide. Mallinckrodt Chemical Works.

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Expires February 27, 1951

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